SOME ASPECTS OF AGRARIAN CHANGE IN THE WEST OF SCOTLAND, 1793-1873

KATHLEEN A. WHYTE

Doctor of Philosophy
University of Edinburgh

1979

To

My parents and my husband

ABSTRACT

This study sets out to examine some of the changes in the structure of agriculture which occurred in an area surrounding Scotland's major industrial city during part of the Industrial Revolution. It draws upon a wide variety of sources, and seeks to evaluate their usefulness as well as utilizing the information which they contain.

After outlining the background to the study and summarising the sources used, the thesis provides a geographical and historical framework for the study of agriculture in the area under consideration. It then goes on to consider leases, the means by which much of the agricultural land in Scotland was held. An examination is made of contemporary practice on the granting of leases, their length and the degree to which they inhibited or encouraged good farming practice. The major crops grown are then considered in turn and attempts are made to explain changes in the temporal and spatial patterns of their growth. The relationship which the crops bore to one another in rotations is then examined, a model is introduced to explain the transition from an infield-outfield to a modern farming system, and several case studies are made. In conjuction with rotations, the use of manures as an additional method of maintaining soil fertility is considered in its temporal and spatial framework. Finally the thesis considers the rôle of livestock in the farming system. The growing importance of dairy farming and pig rearing in response to expanding markets is examined and a model proposed to explain the differing location of various dairy operations. The production of beef cattle

and the use of work oxen is also considered. The changing importance of various breeds of sheep emerges as a major theme, and greater emphasis was placed on the condition of all livestock during the period.

As historical geography in Scotland is still in a relatively early stage of development, this study is necessarily a preliminary one. It is hoped that it will provide pointers for future research.

DECLARATION

This thesis has been composed by the undersigned and is based on her own research

Kathleen A. Whyte

June 1979 Kathleen A. Whyte

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Dr. I.H. Adams, for advice and encouragement, and for critically reading the first draft of this thesis. I would also like to express my gratitude to the following people for discussing the subject of the research, and for suggesting useful source material:- Mr. J. Howdle, Dr. M.L. Parry, Mr. J. Shaw.

I am particularly grateful to Misses Christine Sykes and Margaret Halsall for typing this thesis, and to my parents for their encouragement.

Lastly, I am indebted to Dr. I.D. Whyte for constant encouragement, for typing much of the first draft of the thesis, and for proof-reading the whole of it.

CONTENTS

LIST OF MAPS

LIST OF TABLES AND DIAGRAMS

LIST OF ABBREVIATIONS

A.H.R.	Agricultural History Review
Am.H.R.	American Historical Review
E.H.R.	Economic History Review
Eng.H.R.	English Historical Review
H.M.S.O.	Her Majesty's Stationary Office
I.B.G.T.	Institute of British Geographers Transactions
J.E.H.	Journal of Economic History
J.R.A.S.E.	Journal of the Royal Agricultural Society of England
J.R.S.S.	Journal of the Royal Statistical Society
M.	Martinmas
Ms	Manuscript
M.S.E.S.S.	Manchester School of Economic and Social Studies
M.S.H.S.	Miscellany of The Scottish History Society
N.L.S.	National Library of Scotland
N.S.A.	New Statistical Account
O.E.D.	Oxford English Dictionary
O.S.A.	Old Statistical Account
P.S.A.S.	Procedings of the Society of Antiquaries of Scotland
S.G.M.	Scottish Geographical Magazine
S.H.R.	Scottish Historical Review
S.H.S.	Scottish History Society
S.J.Pol.Econ.	Scottish Journal of Political Economy
S.N.D.	Scottish National Dictionary

S.R.O.	Scottish Record Office
S.S.	Scottish Studies
T.E.L.A.S.	Transactions of the East Lothian Antiquarian Society
T.R.H.A.S.S.	Transactions of the Royal Highland and Agricultural Society of Scotland
W.	Whitsun

In addition to the above, various standard abbreviations have been used.

Chapter 1

I N T R O D U C T I O N

THE TOPIC

Twentieth-century Britain enjoys material prosperity based largely upon the technological developments of the eighteenth and nineteenth centuries. The complex of factors which has brought about these changes, popularly known as the Industrial Revolution, has been perhaps the most vital force in our modern history. The Industrial Revolution was an intricate process whose causes and effects stretched through the political, economic and social spectra. Agriculture, as the most basic industry, producing the necessities of life, played an important role in the developments of the period and must be considered as an integral part of the Industrial Revolution. Its modernisation and improvement were under way by the early eighteenth century and gave an impetus to developments in the manufacturing and technological sectors.[1] By the late eighteenth century agriculture was benefitting from the expanding economy, and the agricultural and manufacturing systems were joined in an almost symbiotic relationship.

Although much has been written on the origins of the Industrial Revolution,[2] and attempts have been made to trace its development,[3] an enormous amount of research remains to be done.[4] The bulk of the existing material deals with England, yet Scotland's case is just as pertinent. Much of the work on agriculture has concentrated on its contribution to the earlier part of the Industrial Revolution, yet its importance in the later period is no less significant.[5] This study examines agriculture in the later part of the Industrial Revolution

in Scotland, at a time when it ceased to be the country's major industry and assumed a less central but still significant role in the economy.

Because little detailed work has been done on the historical geography of late eighteenth and nineteenth century Scotland, it is difficult to know where to begin. By the period of study, numerous aspects of the economy were bound closely together, and it is difficult to separate them from one another. For instance, if one were to make a fully comprehensive study of agriculture, it would be necessary to delve deeply into such topics as transport, population and industry, which are in their own right the subject of years of study. At a later stage of development it is often possible to draw upon the work of others, but at the primary stage it is necessary to start from the beginning. This would have meant that no part of the work could have been done in depth, and this might well have produced misleading and erroneous conclusions. Even within the broad topic of agriculture it was possible to cover only certain aspects. If the whole field were to be dealt with, this would have been at a superficial level which would have rendered the work of little usefulness. Consequently a limited number of facets of agriculture have been considered. This thesis has concerned itself purely with the practice of agriculture, and has suggested linkages with other branches of the economy where these have been indicated.

The central themes of the historical geographer in the study of agriculture are the patterns of production of arable and pastoral farming. Without an examination of these patterns it is extremely difficult to understand any of the changes which were taking place. A major difficulty is to equate the information available with the

questions which are posed. The source material available for this study was limited in the amount and type of information which it gave, so the picture which emerged was necessarily incomplete.

This study then is a pioneer one which attempts to outline the geographical background to the fundamental changes which occurred in agriculture, to bring out spatial patterns, and to provide pointers to further study. It is but one thread in the tapestry of historical knowledge.

THE PERIOD

It is easy to select a period for study, the choice being made on the basis of individual interest, and a paucity of previous work in the field. It is much more difficult, however, to limit this period by specific dates, since time is a continuum. The choice of any year as the boundary of an era is an arbitrary and artificial process, particularly in terms of economic and social history; yet this is necessary to facilitate the handling of material and to provide a clear-cut framework. As long as the problems and limitations of this are realised, and care is taken in the selection of boundary dates, the production of meaningful results need not be hampered by the use of a temporal framework. In this case the study commences at the start of the Napoleonic Wars (1793), and ends at the beginning of the Great Depression which hit British agriculture and industry in the early 1870s. Much agricultural improvement had already taken place by 1793, but the war presented special conditions which produced their own problems and advantages. This period is well documented by the Old Statistical Account and the First Series of Agricultural Reports. 1873 is usually taken as the start of the Depression,[6] and has been

used in this instance. The dates chosen embrace a neat eighty-year period.

The period as a whole is an interesting and dynamic one. Many of the old structures had broken down. The agrarian landscape had changed as the result of the break-up of old farming systems and the social conditions associated with them. Britain was consolidating her position as a major world power. It was a time of war and peace, of the growth of wealth, and of an expansion of economic activity. Britain's internal social and economic structure was changing to meet the needs of rapid industrialisation and urbanisation. Agriculture had developed from subsistence to commercial production and regional economies were coalescing into a national one as Britain became integrated into the world economy. All this, together with the fact that the period lies just outside living memory, and is thus the subject of much fallacy and conjecture, makes the nineteenth century particularly complex to study.[7]

PREVIOUS WORK - A SUMMARY

Much work has already been produced on agrarian history, and a considerable amount of this has dealt with the period since 1750. One category of research has dealt with Britain as a whole, relating either specifically to agriculture, or more generally to economic history.[8] This may involve describing a generalised scheme of development, sometimes utilising selected case studies, or attention may be concentrated on a particular area with the assumption that agricultural practices were similar elsewhere. A common feature of such general studies of Britain is that they rarely refer to Scotland. In some cases all distribution maps end at the Border, while in others

a few Scottish examples are included to make the picture seem complete.[9]

There is another category of research which seeks to correct the imbalance by dealing solely with Scotland. Such works tend to be the Scottish equivalent of the English or British general texts, and as such are usually sweeping in their temporal and spatial scope.[10] Most of this research has been based on secondary sources, sometimes filled out with detailed case studies from primary material.

There is a shortage of regional studies which move from the individual case study to a composite picture. Such research is much more abundant for England;[11] consequently there is a much firmer basis on which to build English general works. Detailed regional studies of agriculture in seventeenth and eighteenth century Scotland have been undertaken by such workers as Dodgshon and Whyte and have modified ideas which had previously been widely accepted.[12] Gray, Gailey, Turnock and others have helped to establish a more complete picture of agrarian conditions in the Highlands.[13]

However, most studies of Scottish agriculture have been historical and few have dealt with the geographical viewpoint.[14] The geographer is concerned with the distribution of phenomena as well as with their existence. The geographer's contribution is important in understanding the influences which produced areal variations in agriculture, and in highlighting regional contrasts which might otherwise have been obscured by an over-generalised picture. The historical viewpoint tends to concentrate on the study of trends in phenomena through time without necessarily setting them in a spatial context, and paying little attention to regional variations. However, agriculture in particular is amenable to, and indeed demands, a geographical treatment in view of its great areal extent and the influence on its character of a variety of other factors, physical, social and economic, which are

expressed primarily in spatial terms. The geographer's contribution towards an understanding of such a topic should then be a major one.

THE SOURCES

A piece of work such as this, which attempts to study the agricultural geography of an area in a past period, must draw upon a variety of source material, rather than concentrating on one source and attempting to assess its value.[15] The use of several types of material permits the assemblage of a composite picture, and facilitates the comparison of data with respect to content and relative merit. However, because more time and effort is needed to cope with the work, to become familiar with each source in turn and to devise a suitable methodology for analysing it, it is necessary to deal with a much more restricted area than if only one source were used.

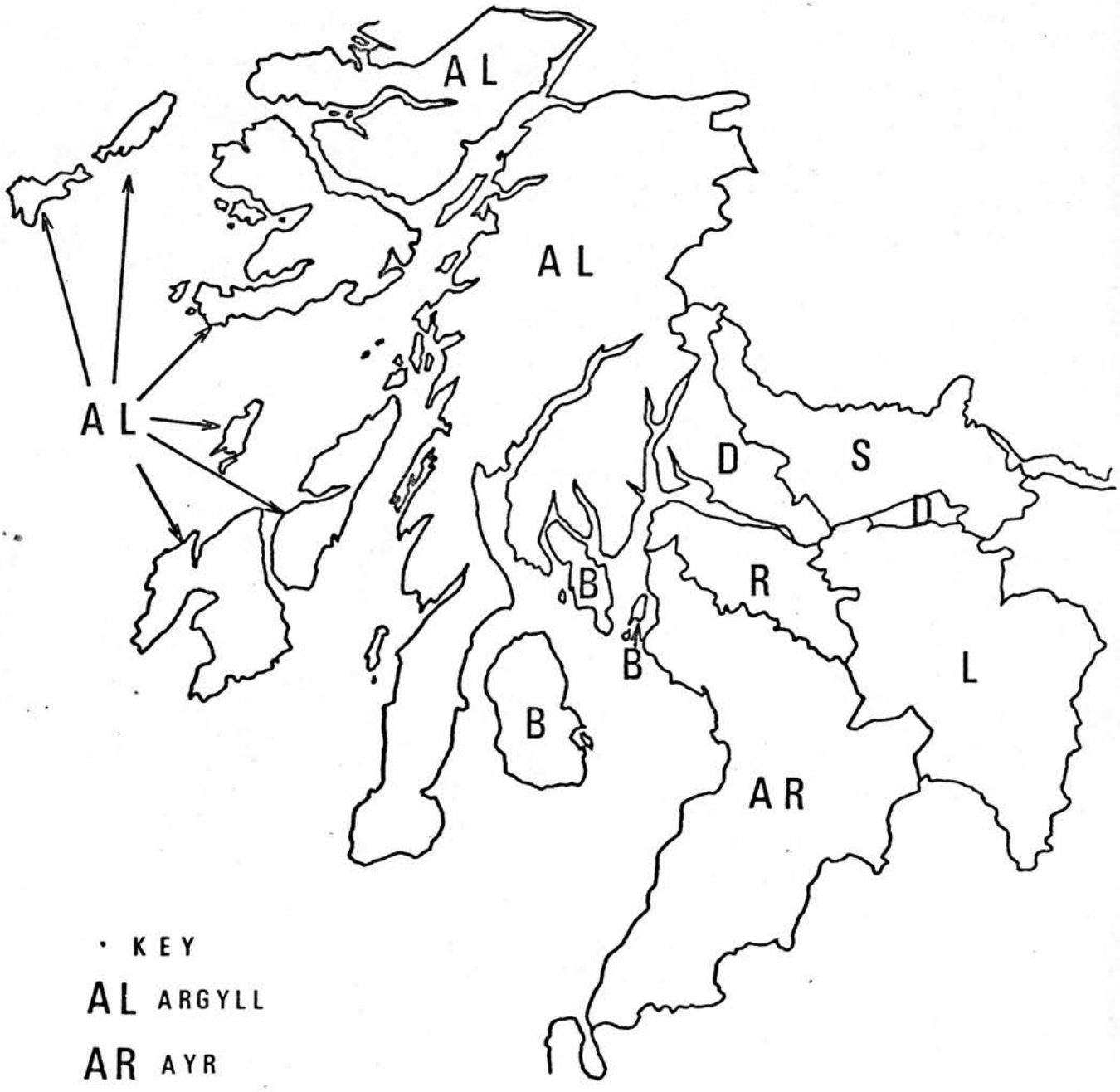
At the outset it was obvious that it would be impossible to deal adequately with the whole of Scotland, yet it was difficult to choose meaningful criteria for selecting a region. An area surrounding Glasgow was chosen, for Glasgow was the fastest-growing industrial city in Scotland, and was essentially a product of the Industrial Revolution.[16] Since a preliminary survey of the sources indicated that they were mainly organised on a parish and county basis, county boundaries were chosen to delimit the area.[17] The seven counties surrounding Glasgow were selected; this area corresponds closely with the modern Strathclyde local government region together with Stirlingshire. Lanarkshire, Renfrewshire and Dunbartonshire were the counties in which one might expect Glasgow's influence to have been most strongly felt. Argyllshire and Bute included areas of remote highland and island country, while Ayrshire was an important dairying

region. South Ayrshire and South Lanarkshire also contained tracts of hill country characteristic of the Southern Uplands. Stirlingshire was included because parts of it have always gravitated towards Glasgow, and because it contained portions of the fertile carselands. It was chosen in the hope that it would be possible to examine the transition from the influence of Glasgow to that of Edinburgh. The area embraces a cross-section of country from the mountains of Glencoe to the orchards of Clydesdale, and from the rolling moors of Carrick to the fertile carselands of the Forth. It may be seen as a microcosm of Scotland as a whole, including a wide variety of landscapes, both urban and rural (see maps 1:1 and 1:2).

The scope of any historical work is strictly limited by the contemporary source material which is available. In earlier times much less information was collected than at the present time, and in a less accurate way. By no means all of this has survived. In a present-day study it is possible to draw on the vast quantity of data now collected, or if this is not suitable, one can collect material for one's own specific purpose. Obviously it is impossible to supplement historical information in this manner. The amount of documentary evidence which is available varies markedly from period to period, subject to subject, and area to area. There were many topics which were not covered, and about which we are able to make only generalised statements.[18] Other things may have been written about, and the records lost or destroyed in the interim. In general, the more recent past is better documented than earlier times, as literacy became more widespread, and the collection of data more careful and systematic. Clearly too there has been much less time for records to have become lost or damaged. There are, however, exceptions to this general rule; for instance, nineteenth century leases have

MAP 1:1

STUDY AREA : COUNTIES (SHIRES)



KEY

AL ARGYLL

AR AYR

B BUTE

D DUNBARTON

L LANARK

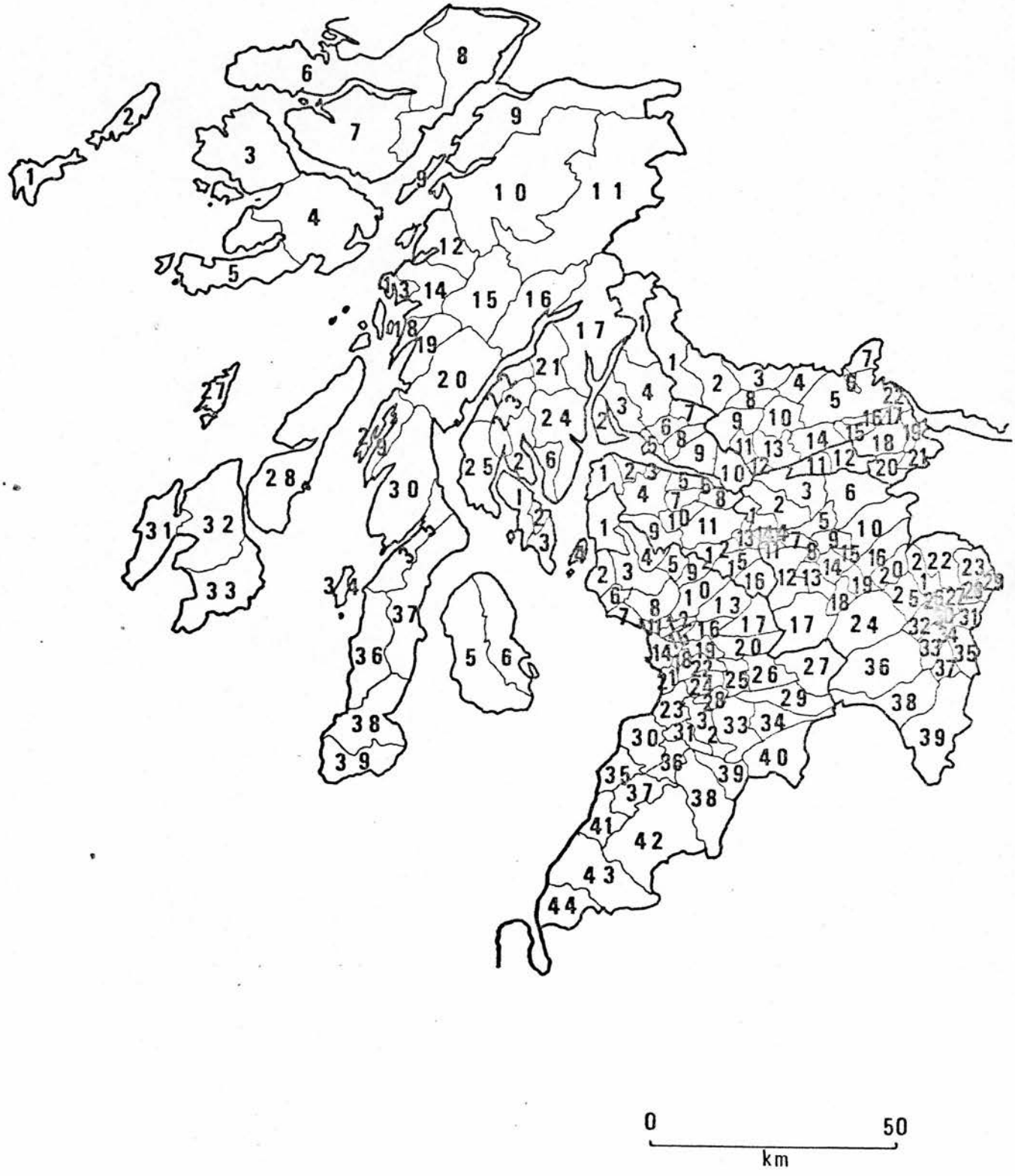
R RENFREW

S STIRLING

0 50
km

MAP 1:2

STUDY AREA - PARISHES



Map 1:2

KEY

ARGYLLSHIRE

1. Tiree
2. Coll
3. Kilninian and Kilmore
4. Torosay and Pennygowan
5. Kilfinichen
6. Ardnamurchan
7. Morvern
8. Ardgour
9. Lismore and Appin
10. Ardchattan and Muckairn
11. Glenorchy and Inishail
12. Kilmore and Kilbride
13. Kilbrandon and Kilchattan
14. Kilninver and Kilmelfort
15. Kilchrennan and Dalavich
16. Inveraray
17. Lochgoilhead and Kilmorich
18. Craignish
19. Kilmartin
20. Glassary
21. Strachur
22. Stralachlan
23. Kilmadan
24. Dunoon and Kilmun
25. Kilfinan
26. Inverchaolain
27. Colonsay
28. Jura
29. North Knapdale
30. South Knapdale
31. Kilchonan
32. Kilarrow
33. Kildalton
34. Gigha and Cara
35. Kilcalmonell and Kilberry
36. Killean and Kilchenzie
37. Saddell and Skipness
38. Campbeltown
39. Southend

AYRSHIRE

1. Largs
2. West Kilbride
3. Dalry
4. Kilbirnie
5. Beith
6. Ardrossan
7. Stevenston
8. Kilwinning
9. Dunlop
10. Stewarton
11. Irvine
12. Dreghorn
13. Fenwick
14. Dundonald
15. Kilmaurs
16. Kilmarnock
17. Loudoun
18. Symington
19. Riccarton
20. Galston
21. Monkton and Prestwick
22. Craigie

cont.../

Map 1:2

KEY

Ayr

23. Newton-Upon-Ayr
Saint Quivox
24. Tarbolton
25. Mauchline
26. Sorn
27. Muirkirk
28. Stair
29. Auchinleck
30. Maybole
31. Dalrymple
32. Coylton
33. Ochiltree
34. Old Cumnock
35. Kirkoswald
36. Kirkmichael
37. Dailly
38. Straiton
39. Dalmellington
40. New Cumnock
41. Girvan
42. Barr
43. Colmonell
44. Ballantrae

BUTESHIRE

1. North Bute
2. Rothesay
3. Kingarth
4. Cumbrae
5. Kilmory
6. Kilbride

DUNBARTONSHIRE

1. Arrochar
2. Roseneath
3. Rhu (or Row)
4. Luss
5. Cardross
6. Bonhill
7. Kilmaronock
8. Dunbarton
9. Old Kilpatrick
10. New Kilpatrick
11. Kirkintilloch
12. Cumbernauld

LANARKSHIRE

1. Govan
2. Glasgow (Barony)
3. Cadder
4. Rutherglen
5. Old Monkland
6. New Monkland
7. Cambuslang
8. Blantyre
9. Bothwell
10. Shotts
11. Carmunnock
12. East Kilbride
13. Glassford
14. Hamilton
15. Dalziel
16. Cambusnethan
17. Avondale

cont.../

Map 1:2

KEY

18. Stonehouse
19. Dalserf
20. Carluke
21. Carstairs
22. Carnwath
23. Dunsyre
24. Lesmahagow
25. Lanark
26. Pettinain
27. Libberton
28. Walston
29. Dolphinton
30. Covington
31. Biggar
32. Carmichael
33. Wiston
34. Symington
35. Culter
36. Douglas
37. Wandell and Lamington
38. Crawfordjohn
39. Crawford

RENFREWSHIRE

1. Inverkip
2. Greenock
3. Port Glasgow
4. Kilmacolm
5. Erskine
6. Inchinnan
7. Houston
8. Renfrew
9. Lochwinnoch
10. Kilbarchan
11. Paisley
12. Neilston
13. Eastwood
14. Cathcart
15. Mearns
16. Eaglesham

STIRLINGSHIRE

1. Buchanan
2. Drymen
3. Kippen
4. Gargunnock
5. Saint Ninians
6. Logie
7. Stirling
8. Balfron
9. Killearn
10. Fintry
11. Strathblane
12. Baldernock
13. Campsie
14. Kilsyth
15. Denny
16. Dunipace
17. Larbert
18. Falkirk
19. Polmont
20. Slammanan
21. Muiravonside
22. Airth

survived in small numbers compared to those for earlier periods (see Chapter 3).

In general there is a large body of data from the nineteenth century. The period was one of assiduous and meticulous information-collection at various levels, although this seems to have been done in a highly unselective way. The Government was becoming increasingly data-conscious, while a large number of societies dedicated themselves to the spreading of knowledge and ideas within their own spheres.[19] At the same time individuals wrote of their travels, experiences and ideas.[20] It is important to remember that literacy was fairly general and was well distributed down the social scale,[21] so that such works could be read by a large public.

Nevertheless, little contemporary analysis was made of the data which were collected. Perhaps this is to be expected since the passion for introspection and self-analysis is seemingly a mid-twentieth century phenomenon, and since the theoretical basis to many subjects, for example, statistical analysis, had not been established. Yet it is vital to see things in their own context and not to super-impose upon them a modern framework. Before studying any documentary material it is necessary to examine the circumstances under which, and the purposes for which, it was collected. The reasons for production can affect the result, either deliberately or accidentally. It is often possible to detect a bias in writing, while in numerical data the figures may be 'weighted' (if not directly falsified!) because of the purpose in hand. It is also vital to understand the thinking of the period, as this would have affected contemporary opinions and prejudices; in particular it would have influenced the things people wrote about and their style of writing.

More will be said about this in respect of individual sources,

but there are some general points worth bringing out here. Firstly the preoccupation with religious and moral questions (probably because a lot of the material was produced by the clergy), and secondly the lack of mathematical precision characteristic of much of the data. Although care seems to have been taken to ensure arithmetical accuracy, there was little concern about the data being truly representative,[22] or about collecting figures to corroborate observations. It must be noted too that the word 'statistical' was used to describe matters appertaining to the 'political State' or to the state of things in general rather than in its current mathematical sense.[23]

The major sources which have been used will now be considered individually (see diagram 1:1 for the time scales which they cover).

BOARD OF AGRICULTURE COUNTY REPORTS

At its establishment in 1793, the Board of Agriculture began its proceedings, 'by employing a number of individuals to draw up Agricultural Reports of the several districts of England and Scotland'.[24] The major work of the Board was seen to be the ascertaining of agricultural conditions and of ways of improving them.[25] The reports vary in length, layout and content, but provide a useful account of the agriculture of the period. The Board was eager to produce the reports as soon as possible, so the results may seem rough and ready.[26] Indeed, they were seen as working documents, and had wide margins to facilitate note-making. When viewed in this light the scheme must gain our respect. It cost around £10 per district to produce the reports, or £10,000 in all.[27] They were designed to be the basis of agricultural improvement; by pinpointing the best and worst practices

of farmers it was hoped that improved methods would be adopted.

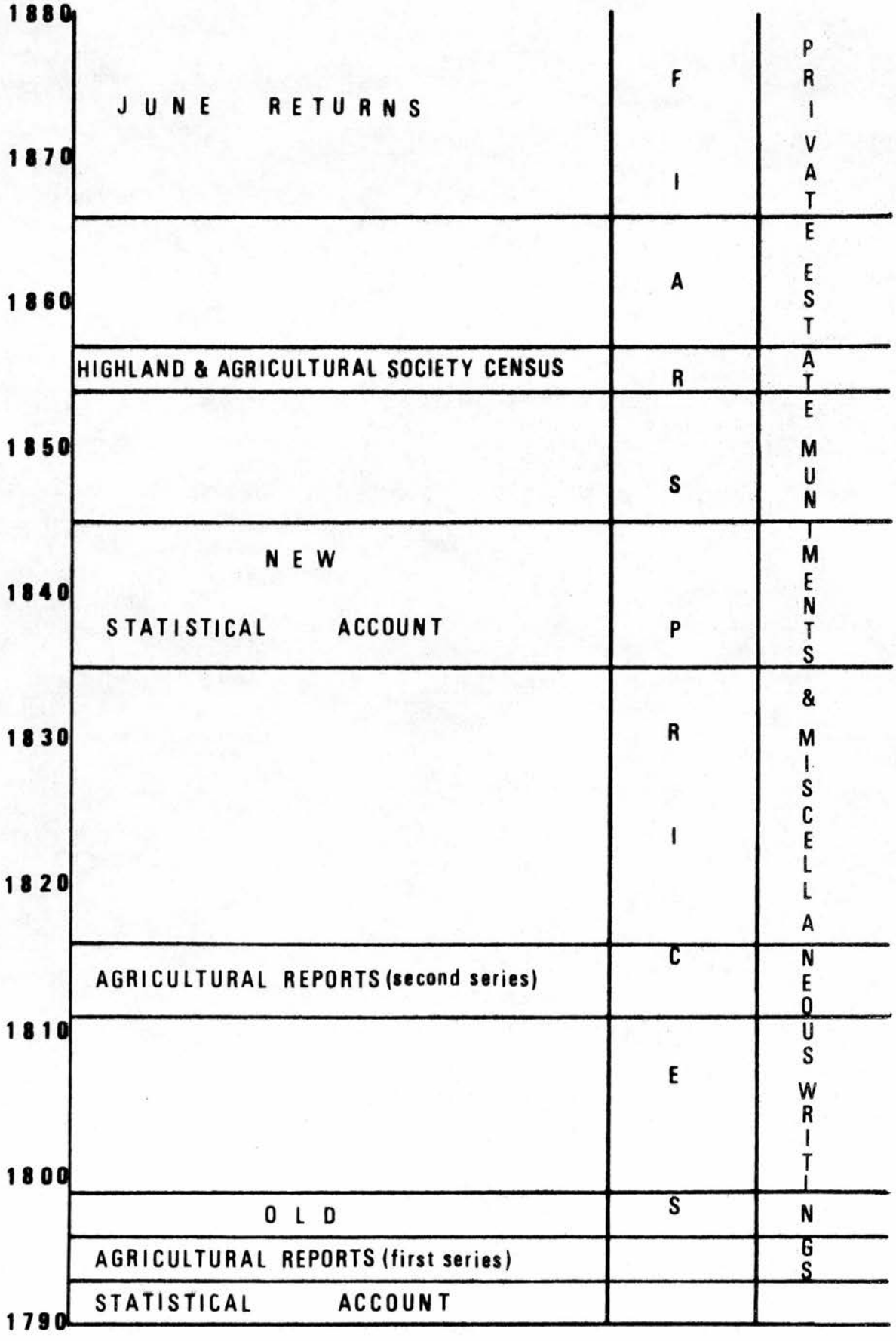
This encouraged the preparation of a new and better series of reports, published between 1800 and 1815. The speed with which the first survey was completed necessitated the employment of some people unsuited to the task.[28] The authors of the second series of reports were selected with greater care for their familiarity with local agriculture, and their ability to provide, 'within a moderate compass, a distinct view of those particular circumstances and practices which discriminate the husbandry of each county'.[29] The second series was drawn up on a uniform model in order to aid comparison between counties.[30] The later reports are generally longer than the first series, but vary considerably in length.

The source is extremely valuable for it provides a great deal of information on agriculture. Many specific examples are given, and the work of creditable farmers cited, but much of what is written is merely the author's opinion. The gap of 15-20 years between the two series of reports is sufficiently large to record changes, although it might have been more helpful if it had been wider. A major disadvantage is that the reports are at a county level, and frequently fail to bring out intra-county variations. In some cases sub-areas are delimited within the county, but where no such distinction is made, one cannot be sure whether there was no variation, or whether it was just not mentioned.

The Agricultural Reports relate to approximately the same period as the Statistical Accounts. Used together, the sources are extremely valuable, frequently corroborate one another and are complementary.[31] The Reports give an overview of average conditions in agriculture, together with some specific examples, while the

DIAGRAM 1:1

TIME PERIODS COVERED BY SOURCES



Statistical Accounts provide a detailed parish-by-parish account of conditions, with some generalisations. As a basic survey of the agriculture of their period the county reports are unrivalled, while for a more detailed study they provide a valuable background.

Board of Agriculture County Reports

	First Series	Second Series
Argyllshire	John Robson (1794)	John Smith (1798, 1805, 1813)
Ayrshire	William Fullarton (1793)	William Aiton (1811)
Buteshire	Robert Heron (in Hebrides) (1794)	William Aiton (1816)
Dunbartonshire	David Ure (1794)	Andrew Whyte Duncan Macfarlan (1812)
Lanarkshire (Clydesdale)	John Naismith (1794)	John Naismith (1798, 1806, 1813)
Renfrewshire	Alexander Martin (1794)	John Wilson (1812)
Stirlingshire	Robert Belsches (1796)	Patrick Graham (1812)

THE STATISTICAL ACCOUNTS

The first two Statistical Accounts are attempts to assess the major facts of the nation at a local level. The idea of amassing agricultural data was suggested by Sir James Stewart in 1767, and Lord Kames followed this up by encouraging Andrew Whyte to gather the accounts of husbandry. It was, however, Sir John Sinclair (1755-1835), probably the strongest individual force in Scottish agriculture at that time, who initiated the collection of information for the Old Statistical Account. He had shown his interest in agriculture through his efforts to improve sheep stock, and in 1790 began the task of a

nationwide agricultural survey. He sent out a circular with 160 queries to the ministers of Scotland's 893 parishes,[32] although hardly anyone answered every question.

The ministers were the obvious people to perform the task in hand, although the New Statistical Account for Dunipace was compiled by the schoolmaster, probably because the minister was unwilling to oblige.[33] As representatives of a national body the clergy had responsibility for the whole country, while the nature of their work meant that, as individuals, they were familiar with the local community and its members. They were also among the most educated members of rural society, and were, in theory at least, those whose integrity could best be relied upon.

The impetus for Sinclair's work was the great changes which had taken place in the country, and he devoted much time and effort to collecting the information from the clergy and preparing it for publication. Some of the ministers replied readily to the enquiry, while others needed prodding. The work ran to 21 volumes, the last of which was published in 1798. It is the product of various authors and despite Sinclair's editorship lacks uniformity.[34] Some of the contributors provided a scant and seemingly reluctant account, while others gave much detailed information. The majority gave considerable detail on topics of personal interest, but less on other things. A lot of useful data were collected and may have raised standards of farming by publicising improvements and shortcomings. In 1825 Sinclair produced an analysis of the Statistical Account.[35]

The first Statistical Account was so successful that in 1832 the Society for the Sons and Daughters of the Clergy recommended to the General Assembly of the Church of Scotland that a new Statistical Account be published along similar lines to the old.[36] The proceeds

were to go to the Society and, being for their own benefit, it was hoped that the clergy would be willing to co-operate. The suggestion was accepted, and questionnaires were sent out to the ministers. The replies were much more complete than had been anticipated; indeed the returns of the New Statistical Account are generally much fuller than those of the Old, although not necessarily as full on agricultural topics. Similar categories of information were covered by both accounts. It had been hoped to produce a general synopsis, but the idea was eventually abandoned in favour of county summaries.

As with all sources, this one has its limitations which present problems of interpretation. The multiplicity of authors means that there is probably a great deal of undetectable bias, and lack of comparability between the parishes. However, as Morgan pointed out, these are likely to cancel one another out, so that an average picture can be obtained.[37] Several points do emerge. As the product of the clergy it is natural that the Statistical Accounts should display a degree of religious bias. It was usual to give a detailed description of the manse, church etc., and to belabour moral and religious questions of the past and present.[38] Another detectable bias is local chauvinism. Loyalty to the parish compelled the ministers to point out local superiority and to find excuses for any blatently inferior aspects.[39] On the whole, the clergy favoured new agricultural methods, and took every opportunity to describe their existence and to praise them. This was perhaps due to a wish to court favour with the proprietors and more important tenants, the instigators of improvement, since it is probable that they were the most active parishioners as well as having financial control over the minister. It is likely too that the clergy recognised the value of improvements, and wished them to spread for the benefit of society. Their education and dealings with all classes of men may have

enabled them to develop a more enlightened view of change than did many people. Lastly it must be noticed that the accounts are written in a verbose and sententious style typical of their period.[40] This can make tenious reading and, since much of what was written appears pedantic, could lead one to a poor and scathing treatment of it.

The bias evident in the material need not render it invalid, however, for it is easy to detect prejudice expressed in such a blatent form, and to make allowances for it. The ministers had no reason to falsify information and it would seem that, although there are many omissions, the information presented is in essence correct. Care must, however, be taken to distinguish between fact, for instance crops grown, and opinion, for instance the improvements which might be expected from certain changes.

The characteristics and limitations of the two Statistical Accounts are similar, and because of this it is possible to compare the two works. This may be difficult in practice, however, because a parish for which there is much detail in one account may be badly covered in the other, or different topics may be dealt with. Despite this, the two accounts provide a unique and comprehensive body of information,[41] and record many changes during a 40 or 50 year period of rapid development. It is because of their all-embracing nature that the Statistical Accounts have been used as a major source for this study, although the information requires much sorting before it can be used in any research project.

FIARS PRICES

'The Fiars are the rates of average prices, usually fixed, of the different kinds of grain, being the growth of the county for the

preceding crop, and which rates serve for ascertaining the values in money, wherever it is agreed that the fiars shall be the rate of payment'.[42] They were struck annually on a county basis, usually at Candlemas (2nd February), by the sheriff courts for the crop of the previous year, for example, the fiars for the harvest of 1844 were struck at Candlemas 1845. However, the fiars used in this study are designated by the year of the harvest not the year of striking. Fiars were used to settle such fixed payments as feu duties, rents and stipends and were an attempt to beat inflation. The practice was an ancient one, originally instituted to ascertain the value of victual rents and feu duties payable to the Crown, although it was fairly late before the practice became universal.[43]

Sometimes the fiars were struck at Lammas (1st August) as well as Candlemas. The prices were meant to cover all main types of grain grown in the county. In the seventeenth and eighteenth centuries this usually meant oatmeal and bere only, but later a variety of crops was dealt with, and these were often split into several grades or qualities.[44] In the seventeenth century there was a lack of uniformity in the striking of the fiars, and they were notoriously unreliable.[45] In 1823 however, the Court of Session passed an Act of Sederunt to regulate the timing and method of striking.[46] The prices were to be fixed by a jury of 15, at least eight of whom were heritors familiar with prices and assembled from the sheriffdom. They were to meet between the 4th and the 20th of February annually and to call witnesses to discuss the prices charged since the 1st of November last.[47] Eventually they had to declare 'the price at which the several sorts of victual have been bought and sold'.[48] The Act failed to achieve complete uniformity because its dictates were not followed closely.[49] However, some degree of comparability was achieved, and the system was more satisfactory

than it had been previously.

Nevertheless discontent continued, and in 1852 Paterson was able to point out that 'the modes of striking the fiars in the several counties of Scotland are different, inconsistent and contradictory'.[50] He criticised the time of year at which the fiars were struck, and pointed out that at the early part of the season, raw ill-preserved grain went to market, and rendered prices lower than at any other time. Later in the year the market was over-supplied. He advocated the striking of fiars twice yearly, in April and July, or if only one was struck, suggested that this should be in May.[51]

The witnesses were selected on account of their roles in grain transactions, for example, farmers, bakers, grain merchants, brewers. This often meant that the same transaction was taken account of more than once, perhaps by farmer, merchant and baker. Also the jurymen were often not summoned from different parts of the county, and so could not give a truly representative picture of prices. In the actual striking of fiars, insufficient evidence was frequently taken and too few witnesses called. It was not sufficient to take account only of crude prices; quantities of grain sold at these rates had to be noted, so that a true average could be obtained.[52] Cleland stated that this was done in 1832.[53] Another problem was the lack of uniformity of weights and measures prior to 1827, and the variations in crops covered by the fiars.[54] Difficulties occurred too if a lot of grain was sold outside the county; sometimes it was excluded altogether, and sometimes carriage was subtracted from the cost. The first method was obviously bad, while the second was unsatisfactory since often a market town outside the county was nearer than one inside it; for instance, the best grain from the Perthshire carselands went to the nearby markets of Dundee and Stirling.[55]

Prices are a vital indicator of changing economic conditions, and despite all their handicaps the fiars are a useful source, the like of which is completely lacking for England. The measures used are always stated, and can readily be converted to some standard.[56] The fact that fiars were used as the basis for numerous transactions would suggest that they had some validity.[57] Despite the different modes of striking them, there is great similarity between the fiars of the various counties, and they tie in closely with the English price levels.[58] Paterson's objections are likely to have been overstated, since he set out to criticise the fiars and their mode of assessment. Indeed Cleland was able to state in 1832 that fiars had been struck impartially and accurately for some time.[59] If they are used with care, the fiars can provide a valuable index of price trends.

PRIVATE ESTATE MUNIMENTS

Estate muniments comprise miscellaneous collections of material belonging to private families and organisations. This source is the most varied and haphazard of those considered here, for it consists of any written items which have survived in the hands of a particular party. Personal letters, tradesmen's bills and receipts, leases, newspaper cuttings, wills, legal documents, estate and farm accounts, and miscellaneous jottings all come within the scope of this source. An individual estate collection may or may not relate to a specific period, area or topic. The items were collected for no single purpose, and sometimes for no purpose at all, so among them there is much irrelevant material.

It is invariably the upper or landowning classes who have retained documents, probably because of continuity of place of resi-

dence and the possession of space in which to store even seemingly useless material. Many of these family collections have now been gifted or loaned to record offices, although there are still vast quantities of historical documents in private hands.

For this particular study attention has been confined to those collections in the Scottish Record Office and the National Library of Scotland, the chief repositories of archive material in Scotland.[60] The National Register of Archives includes a list of collections still in private hands, but access to these can be difficult and at best involves a large outlay of time and money in obtaining the permission of individual landowners then travelling to each place in turn. It was decided that a consideration of this material was unlikely to repay the time and effort involved. Of the collections in the Scottish Record Office, some have been carefully catalogued and an inventory of each item produced, while others are handlisted by the bundle or box. Because of the varied nature of the material, only a small proportion of it is valuable for any topic, so unless every item is listed, many documents must be discarded. Handlists in particular require much sorting. Estate and farm accounts, roup rolls, tacks and diaries tend to be most useful for an agricultural topic. Due to the haphazard survival of the source, and its limited coverage, it is possible to use it only to illustrate ideas from other sources and to formulate tentative theories. However, Whyte has used estate accounts as the basis of his study. There must have been many aspects of estate organisation which have eluded documentation, and there are areas for which no estate collections have survived. The picture is patchy but it gives a degree of detail seldom found in other sources.

There is a surprising paucity of material in estate collections relating to nineteenth century agriculture. One would expect there to

be an increase through time in the amount of data available. However this is not the case; in many collections there are few items relating to the period of study. There are often boxes of tacks from the seventeenth and eighteenth centuries, but few from the nineteenth. It is probably that in the late eighteenth and the nineteenth century so much written material was produced that some of it had to be discarded as soon as its usefulness ended. There are few of the neatly-docketed estate accounts sometimes found for the early eighteenth century and few complete runs of data. This is perhaps because things were changing rapidly. Estate accounts have been used to fill in and to highlight the more comprehensive information of other sources, and for this purpose are extremely valuable.

AGRICULTURAL STATISTICS

Until the nineteenth century, 'governments did not collect statistical information for the benefit of their subjects, or even as a guide to policy, but only as a by-product of some administrative (usually fiscal) activity'.[61] Indeed it was often thought that the collection of such material was contrary to the national interest, and some people were reluctant to provide it.[62] But by 1856 James Hall Maxwell, chairman of the Highland and Agricultural Society of Scotland, was able to state that 'the farmers of Scotland have practically satisfied themselves that the inquiry is in no respect inquisitorial, and that they cannot possibly divulge or compromise individual interests. They appreciate with intelligence the importance of statistical information'.[63]

Difficult economic conditions, severe weather and threatened starvation during the Napoleonic Wars caused the Government to collect

information on the agricultural situation. Returns were collected in England for 1798, 1801 and 1803.[64] This was the first of a series of experiments in data collection. An attempt in Bedfordshire in 1836 was a failure, but in 1844 James Caird and Milner Gibson secured House of Commons support for a motion seeking "authentic information on all matters connected with the agriculture of the United Kingdom".[65] It was pointed out "that some plan for ascertaining the annual produce of the soil would be highly advantageous to the country at large, and especially to those who have produce to bring into the market, and who might thus be supplied with an ampler means than they now possess of judging the time at which they can dispose of it with greatest advantage".[66] Small-scale experiments conducted in England failed, but in Scotland information collected in 1845 by the Board of Trade through the village schoolmasters of Midlothian was a success.[67]

Gibson continued to advocate data-collection but with few results. However in 1853 the Highland and Agriculture Society of Scotland was commissioned to make another experiment in Haddington, Roxburgh and Sutherland.[68] The data were collected by the Society's enumerators and the project was financed by a Treasury grant. It was a success, and from 1854 to 1857 the census was taken for the whole of Scotland.[69] There were still problems when the same kind of thing was tried in England, and in 1856 Gibson's bill foundered in the Commons due to the opposition of country gentlemen (it had succeeded in the Lords). By this time most leading states had adequate systems of agricultural data collection.

In 1865, £10,000 was voted for the collection of Britain's agricultural statistics, probably because an outbreak of rinderpest emphasised how useful such data might be. As president of the Board of Trade, "On 23rd February 1866, Milner Gibson announced that a

schedule drawn up by the Board of Trade would be sent through the post to occupiers of agricultural land, and collected by officers of the Inland Revenue ... The acreage returns were collected on 25th June and constitute the first comprehensive annual census to cover the whole of Great Britain".[70] Livestock statistics were taken in March of the first year (due to the rinderpest outbreak) but thereafter were collected in June.

a) The Highland and Agricultural Society Census

The circumstances of collection of this census have already been outlined, but consideration must also be given to factors which have a bearing on the information collected. In 1854, under the organisation of James Hall Maxwell, 1,100 tenant farmers were recruited to enumerate the census. There were 119 collecting districts whose delimitation was based on agricultural and geographical factors. The enumerators served as members of the parish committees and were found to be helpful and energetic in their duties despite the great volume of work required of them.[71] "It has been observed in England 'that we are living in an age of statistical imposture, and that many returns in reference to agriculture are made by men who are not acquainted with rural life'. Whatever truth there may be in this statement elsewhere, it has, assuredly, no application to Scotland, as the estimated returns, now submitted emanate from men selected on account, not only of their intimate acquaintance with rural life, but their integrity, skill and experience, and their special knowledge of the agriculture of the localities within which they act."[72]

In these initial stages, "the difficulty of procuring accurate lists of occupants was the one most productive of trouble and delay ... persons who had left the country or were dead being frequently inserted,

while the names of actual occupants were improperly repeated".[73] Corrections were carried out, so in the later years there was less trouble; in 1855 householders, feuars and villas had been struck off the list of occupants, and farms in different parishes but leased by the same person were put together.[74] In England it proved extremely difficult to collect statistics of this nature, largely because farmers feared their landlords who thought that the data were for taxation purposes.[75] In Scotland the landlords had less hold,[76] and "the Scotch farmers as a body, at once recognised the importance and utility of the measure, and endeavoured to support and forward it by readily and faithfully affording the information required from them ... instances of positive opposition and refusal have been extremely rare".[77] For 1855, of the 50,000 schedules sent out, only about 10 were not accounted for.[78] Nevertheless it was from the landlord class that opposition came.

Holdings of less than £20 in the Highlands and of less than £10 in the Lowlands were omitted for all four years. However, in 1854 smallholdings were enumerated separately. "Though the number of such occupants is great, the statistics of their holdings are unimportant, and not being subject to sudden fluctuations it was conceived that the results obtained last year may with safety be readopted."[79] This conclusion cannot be assumed to be valid, so we have smallholding data for one year only. For the larger holdings, stock figures and acreages of various crops per county were enumerated, net yields for counties and yields per acre of several county districts were given, together with a comment on how well the harvest compared with those of the previous five years. None of the data were given at the parish level.

b) The June Returns

The agricultural statistics collected for the whole of Britain from 1866 onwards, and called the June Returns because of their month of collection, were completed on a purely voluntary basis. In the nineteenth century the Government had no statutory powers to compel a return to be made, or to prosecute in cases of deliberate error.[80] Any omissions were compensated for by estimates which must have severely affected the results for some areas. However, "it is only in parts of England that difficulty is experienced in obtaining by voluntary returns such simple but important national statistics as the acreage of crops and the number of livestock. In Wales and Scotland the Agricultural Returns are most willingly given and it is believed with much accuracy."[81] The original returns were destroyed after those of the following year had been checked against them, so as to preserve the anonymity of individual farmers, but parish summaries were kept.[82] Summaries of the counties of Scotland were published annually in Agricultural Returns for Great Britain. The method of census collection and processing changed little until the use of electronic equipment in recent years.[83]

In 1866 the minimum size of holding dealt with was five acres, in 1867 and 1868 there was no minimum, but from 1869 to 1892 only holdings of more than $\frac{1}{4}$ acre were recorded. All livestock were counted irrespective of the size of holding.[84]

Various problems attend the use of this source. As Coppock points out, returns were made on the basis of holdings, and these may have been within two or more parishes, in which case the return would have been made in the parish of residence.[85] This can cause considerable distortion where farms were large and parishes small. Another potential source of error occurred if farmers objected to making

returns and estimates had to be made. Nevertheless, the census is a useful source of information. The returns are best used over a wide area for, as Coppock has observed, the problems of returns having been made to another parish is thus lessened. The difficulty caused by omission and the consequent need for estimation is likely to have been less serious in Scotland than in England. This has been pointed out with regard to the Highland and Agricultural Society census; indeed James Hall Maxwell remarked on the completeness of the returns and praised the farmers for their co-operation.[86] The complaints of the enumerators of the June Returns related specifically to England; "the reluctance and even refusal in many instances of landowners in England to afford the information respecting acreages of crops which the Government desired to have occasioned much trouble".[87] The worst refusals were in South East England where rents were often decided on stock.[88]

The returns list the acreages of a variety of crops, together with numbers of stock, and size of holdings at the parish level (see later). The acreages of the various crops were mapped as percentages of the improved land (excluding rough pasture) for each parish for 1870, and listed on a county basis, thus making the results comparable with the 1854-7 census data. To produce maps for each year from 1866 to 1873 would have involved much work, and it was felt that the results would not justify the time spent. A detailed study was made for 1870 only, and county summaries were used for the other years so as to highlight changes. 1870 was chosen because "many authorities take 1870 as the first year in which the statistics are reasonably complete and reliable".[89]

OTHER SOURCES

Various other sources were used, but they will not be reviewed in detail, either because they were not felt to merit individual consideration, or because they were used to a limited extent.

Newspapers

Several newspapers were produced and circulated in the area and period of study, and many of these have survived. Some may be found in bound volumes in the National Library of Scotland. They frequently contain advertisements for farms, together with the prices of provisions at local and national markets, and sometimes give comments on the state of the harvest. It was felt that farm advertisements could not be relied upon, because they invariably stressed the improved nature of farms and their general superiority. Much of the information must have been exaggerated, and could shed little light on the spread of improvements. The price data were felt to be more useful.

Register House Plans

This source ties in closely with estate muniments, most of the plans having come from private estate collections.[90] They are considered here, however, because they are housed and classified separately from the estate material, and they provide a particular type of information. Most of the plans were of no value to the topic in hand, although they included some fine examples of cartographic skill. One or two did give details of crop rotations and agricultural practice, so the use of the plans was felt to be worthwhile although the return was small.

Miscellaneous Contemporary Writings

These include travellers' accounts, agricultural treatises, biographies and reports. There are many such works which are useful

to a greater or lesser degree. They have little in common with one another, apart from a pedantic style, and portions from them will be mentioned where relevant.

Government Reports

The results of Government enquiries, published in the Blue Books, are occasionally relevant to agriculture. The abstract of the June Returns falls into this category, as do enquiries into the conditions of rural workers. Generally they are straightforward to use and are clearly set out. They were, however, seldom collected for an agricultural purpose and their value is limited.

These then were the sources which were used in this study. Each has its own advantages and limitations. Their relative value is best judged by reference to the main body of the thesis.

Chapter 2

THE STUDY AREA

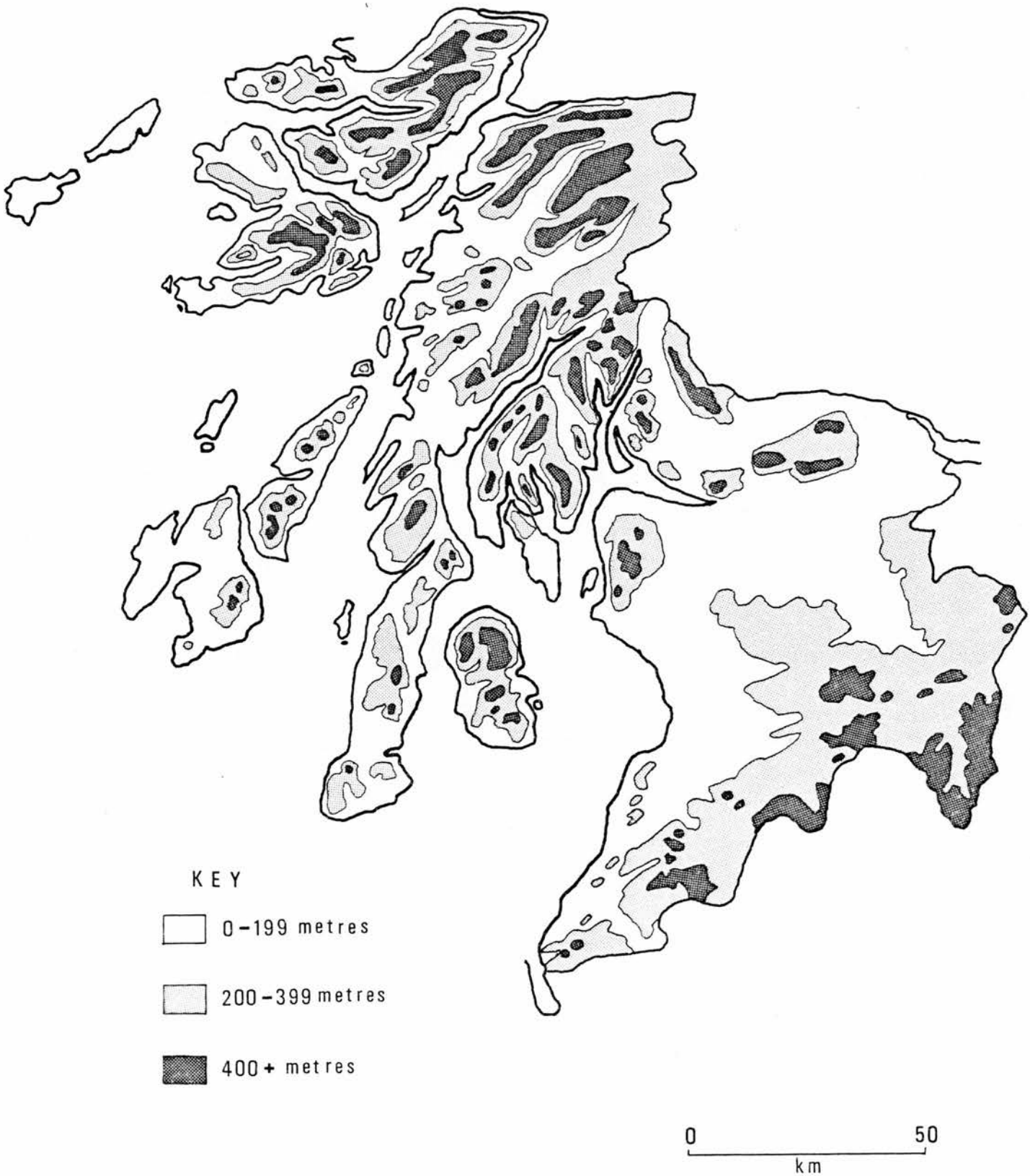
The reasons for which the period and area of study were selected have been outlined already, and the sources which were used have been described. It was felt necessary, however, to provide a geographical and historical background against which these could be fitted. An attempt will now be made to provide such a framework for the thesis and for the themes explored there. This will necessarily be superficial, but it is hoped that it will be of value in placing the study in its wider spatial and temporal context.

RELIEF AND GEOLOGY

The area is characterised by the great diversity of its relief and geological structure; indeed, it was partly for this reason that it was selected in the first place. Topography and lithology frequently change rapidly over very short distances. This means that it is possible to recognise a number of farming regions of restricted extent. Furthermore, this makes generalisation extremely difficult, for land capability can vary greatly within the confines of a parish. This can occur even in the central portion of the study area where parishes are relatively small. In the Highlands and Southern Uplands parishes are often very large and such variation within the bounds of a single parish is frequently extreme. This must be borne in mind when considering the distribution maps which, because of the character of the sources, are based on parish boundaries. Another characteristic of

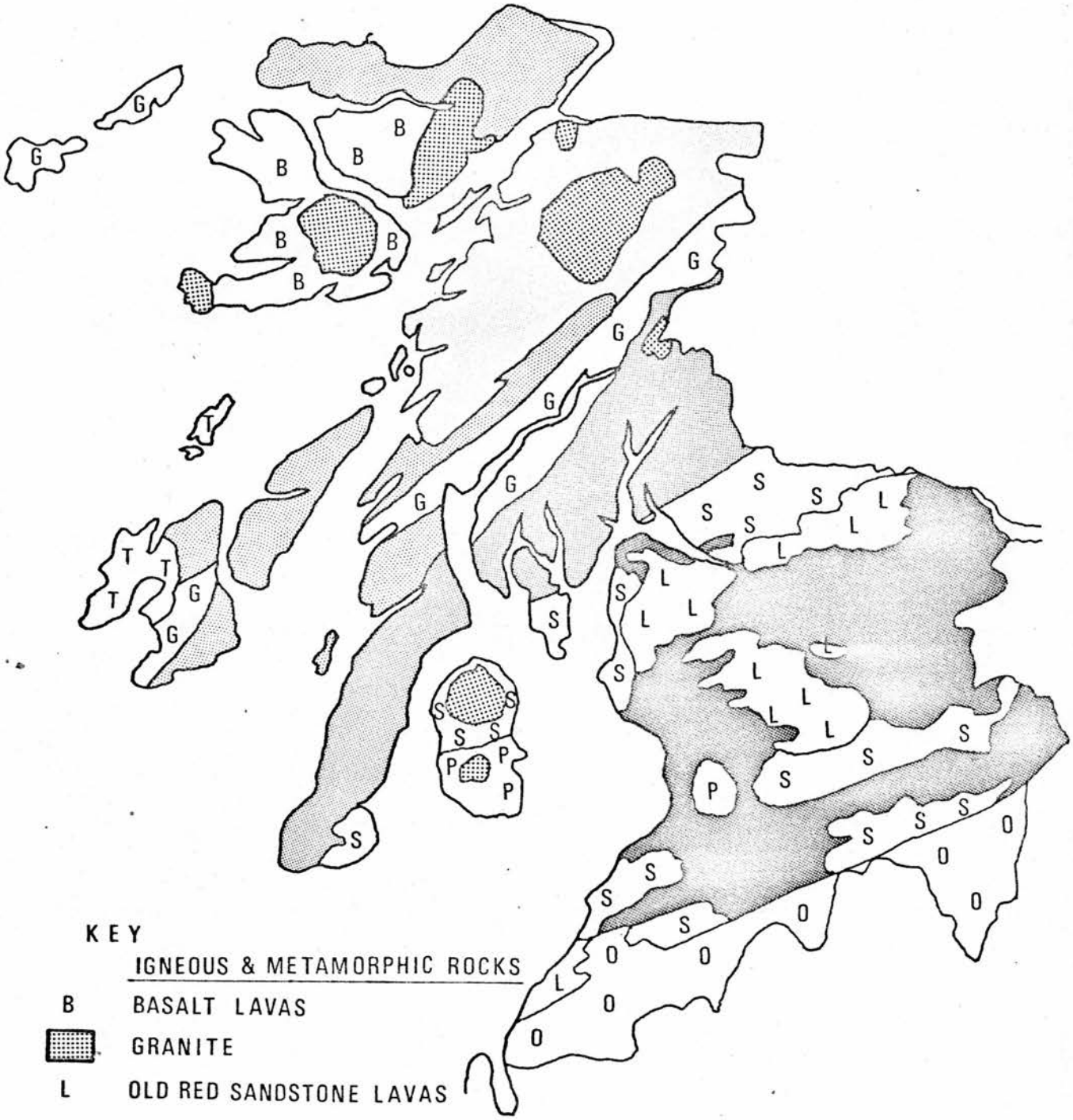
MAP 2:1

RELIEF



MAP 2:2

GEOLOGY



the area is the sharpness of the physical boundaries, which often produce equally abrupt contrasts in land utilisation. For instance, the close juxtaposition of poor, rough grazing and fertile arable land which is found on either side of the fault-scarps of the Campsies, or the Highland Boundary Fault (see maps 2:1 and 2:2).

The Lowlands

The lowlands of the study area form part of the structural province which is frequently referred to as the 'Midland Valley' or 'Central Lowlands' of Scotland. These designations tend to obscure the fact that the actual lowlands are of relatively limited extent and, being broken up by a series of upland areas formed of more resistant igneous rocks, are very discontinuous. Most of the low country is developed on sediments of Carboniferous, Old Red Sandstone and Permian age; limestones, sandstones, shales etc., but the character of the sediments varies considerably with the locality. These relatively weak sediments can, however, form areas of quite elevated country in some districts. This is particularly noticeable on the bleak, poorly-drained plateau country of North Lanarkshire and Stirlingshire between Airdrie and Falkirk where, at heights of 600-900 feet, arable farming has probably always been marginal and rough grazing the usual land use.

The lowlands proper are concentrated in the Basins of Central Ayrshire (which is drained by a number of streams) and those of the Forth and Clyde. The gaps between these basins are generally low (low enough to have allowed canal construction) and are often produced by downfaulted corridors, as in the case of the gap between Johnstone and Dalry, and the trench between the Ochils and the Campsies at Stirling.

However, for the most part, the three basins are separated by extensive areas of infertile hill and moorland country. Within the lowland basins the distribution of two types of strata has been of particular significance to agriculture; that of limestone and of coal. Coal was important not only because it was necessary for burning lime, but because its presence gave rise to the industrial developments of the area, which in turn stimulated agricultural production, but also competed for some of the best quality land. Within the basins, relief is often diversified by small local igneous intrusions of Carboniferous age, which sometimes form small-scale upstanding features like Dumbarton Rock, Dumgoyne in Strathblane, Loudon Hill in Ayrshire or Stirling Castle Rock.

Within the lowland areas, the effects of solid geology are generally masked by superficial deposits, particularly glacial drift and outwash from the Pleistocene period. In the lower Clyde Basin and in Central Ayrshire there are extensive drumlin fields producing a landscape in which farming was often difficult before the advent of effective techniques of drainage, and which even today show great contrasts in agricultural use between the more freely drained drumlins and the ill-drained hollows in between. Indeed, the frequent occurrence of ill-drained land is one of the most important characteristics of the lowlands of the study area, and one which has had considerable bearing on the development of agriculture. Other areas have been covered by extensive outwash deposits, such as the country around Carstairs; here the soils are lighter but drainage problems can also occur in the hollows. Complexes of end moraines diversify the relief in the lower Forth Valley and at the southern end of Loch Lomond. Along the shores of the Firth of Clyde raised beaches have been of great significance in providing light, easily-worked soils, which must often have been among the earliest cultivated in the area. The intense landscape changes of

the glacial and immediate post-glacial epochs have also left their mark in a series of buried channels in the lower and middle Clyde basin, and extensive deposits of alluvium, both here and in the Forth valley. In the Forth, high sea levels at the end of the glacial period led to estuarine conditions in the middle part of the basin, with the deposition of a fine marine clay, the famous Carseland. Subsequent retreat of the sea with isostatic uplift caused the extension of a peat cover averaging fifteen to twenty feet in depth, though even thicker in places, over most of the clay. The high fertility of the carselands, and particularly their suitability for intensive arable rotations, was only utilised when clearing of the peat, reclamation and drainage operations occurred towards the end of the eighteenth century.

These lowland basins are separated by blocks of hill country like the Campsies, the Kilpatrick Hills and the Renfrew Heights, whose elevation is often considerable (the Campsies: Earl's Seat 1894 feet; the Kilpatrick Hills: Fynloch Hill 1313 feet; the Renfrew Heights: Hill of Stake 1711 feet). These hills are mostly developed on igneous rocks of Carboniferous age which in general give rise to thinner, more acid soils than the lowland sediments. They are often bounded by fault scarps which are steep and occasionally precipitous, as above Strathblane, but are generally plateau-like and gently rolling on top, without distinct summits, though sometimes stepped, reflecting the outcrop of successive lava flows. Such areas have in the past been almost entirely given over to rough grazing, although at times pressure on arable resources has been sufficient to cause an extension of the limits of cultivation up some of their lower slopes, as is evidenced by remnants of ridge and furrow ploughing at altitudes well above those of modern cultivation.

The Southern Uplands

The Southern Boundary Fault which divides the Central Lowlands from the Southern Uplands rarely has a distinctive topographic expression in the study area. Indeed, in areas like Central Lanarkshire the hills above Douglas Water, developed on Carboniferous strata, blend imperceptibly into the Ordovician greywackes of the Southern Uplands. The Southern Uplands are composed mainly of thinly bedded and intensely folded greywackes, mudstones and shales of Ordovician and Silurian age. There are some inliers of more resistant igneous rocks, as in the area around the Spango Water, where granite outcrops at the surface, and in Carrick the granite complex of the Galloway hills, culminating in the Merrick (2764 feet) produces a wilder and more craggy landscape. The intense folding and the limited effect on local relief of any one of the thin, contorted beds has resulted in a landscape of sweeping curves from hill summit to valley floor. The hills are frequently high (Green Lowther 2403 feet, Culter Fell 2455 feet) but although their slopes are sometimes steep they are rarely precipitous. The flatter summits and gentler hill slopes generally have a covering of hill peat, while most of the valleys have been infilled with alluvium allowing pockets of cultivation (although drainage has frequently been a problem in the past). The valleys tend to be relatively narrow, however. The greywackes and shales produce soils which are relatively thin and acid, and these hills form excellent sheep pasture.

The Highlands

The Highlands are formed of ancient Pre-Cambrian rocks, most of which are crystalline and metamorphic: schists, gneisses and quartzites, which are exceptionally resistant to erosion. Extensive granite bath-

oliths also occur, as in the Ben Cruachan area. The Highlands have formed a land mass throughout most of geological time, but have undergone many changes. They were folded in Pre-Cambrian times, then weathered to a peneplain under semi-arid conditions. This process was repeated in Siluro-Devonian times and the weathered material was laid down as Old Red Sandstone in the Central Lowlands and in Southern Kintyre. The ancient schists are thrown against less resistant conglomerates of the Upper and Lower Old Red Sandstone groups along the Highland Boundary Fault which, in the study area, is frequently an abrupt fault-line scarp, as in the case of the Menteith Hills overlooking the Upper Forth valley. It is thought that Triassic, Jurassic and Cretaceous sediments may have been deposited over much of the high land, but this cover has been almost entirely removed and only isolated remnants survive in Mull and Ardgour. During the Alpine earth movements further fracturing took place, culminating in a volcanic outburst on the west coast which laid down extensive areas of basaltic lava flows in Mull. It also allowed the intrusion of swarms of Tertiary dykes which not only traversed the Highlands, but the Central Lowlands and Southern Uplands as well. Of especial importance to land use in the Highlands is the outcrop of a belt of limestone along Loch Linnhe, particularly in Lismore. The Pleistocene glaciations profoundly altered the detail of the Highland landscape, forming corries and excavating glacial troughs in the higher mountain areas, scouring the lower coastlands in areas like Kintyre, altering drainage patterns and depositing drift extensively beyond the Highland line. In the early post-glacial period high sea levels were responsible for the widespread deposition of beach material along the coasts at altitudes up to 100 feet and more above present-day sea level. The raised beaches have often formed the nuclei of arable cultivation, their soils being light

and relatively easy to work, though not necessarily well drained in all cases.

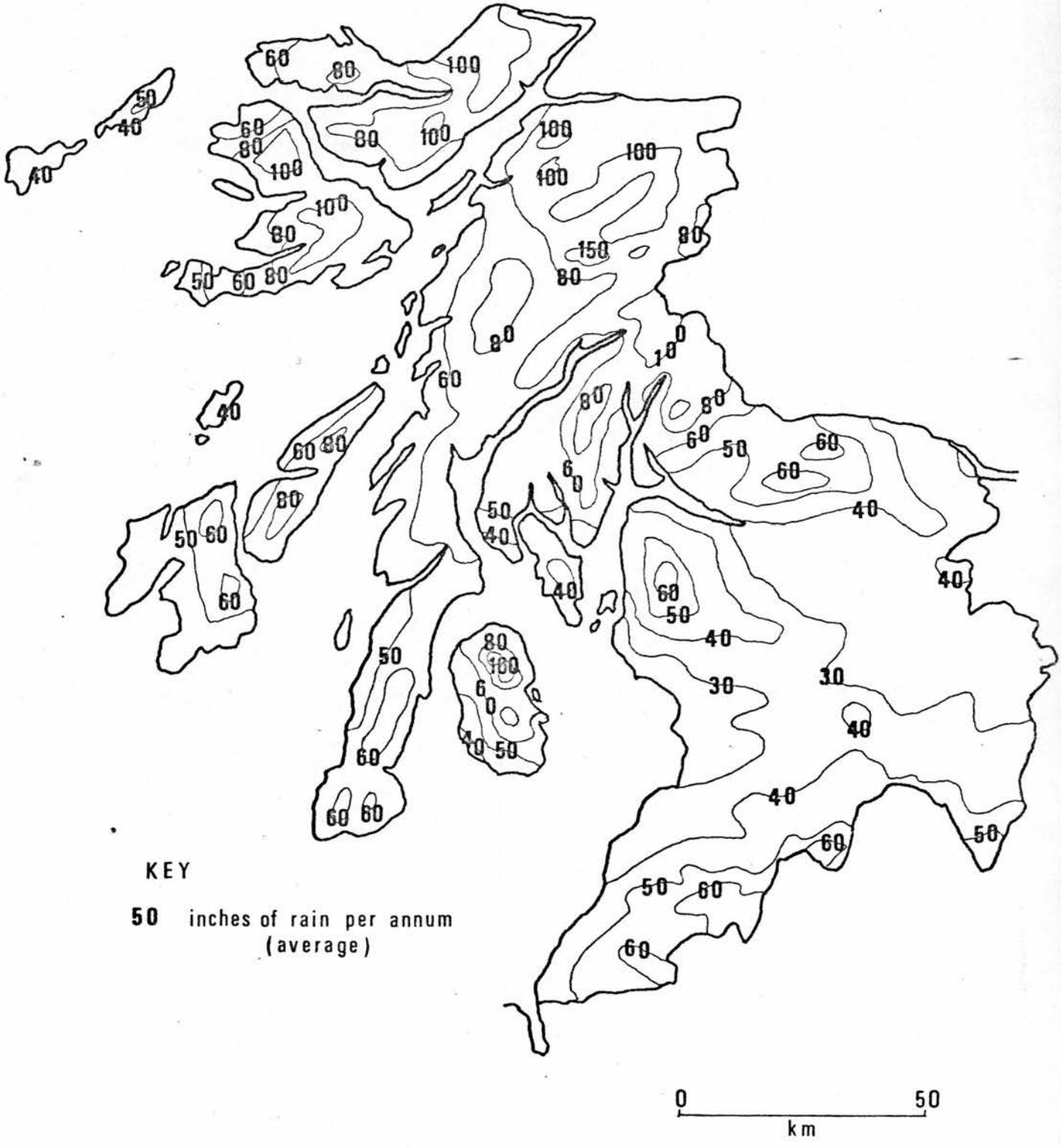
The relief of the Highlands is as varied as their geological structure and there are great contrasts between the higher mountain groups of Glen Coe and Ben Cruachan and the landscape of South West Argyll where, although relief is generally low, the topography is frequently very rugged in detail.

CLIMATE

In general terms, the climate of the study area is of a temperate matitime type and is characterised by fairly equable temperatures and a moderately high rainfall. However, due to the topographical diversity of the area, there are considerable climatic contrasts within it. Over large areas of Argyllshire the climate is dominated by the presence of the mountains, and the variations in climate within this county are largely produced by differences in altitude and aspect. The climate of the mountain summits is virtually sub-arctic above about 3000 feet and in these areas snowfall may occur at any time of the year and lie for well into the late summer in some locations.[1] The mountains themselves are the principal cause of the intense precipitation in this area. Most of the precipitation is orographic and there is a strong correlation between the relief and rainfall maps.[2] Substantial areas of the interior of Argyllshire have an average annual rainfall in excess of 100 inches, as does a limited area of Mull.[3] Heavy rainfall is inevitably accompanied by cloudiness and low temperatures which shorten the growing season not only in the mountains but also in the neighbouring glens. In inland glens the incidence of frost is high, and in such situations frost may occur even in the summer months.[4]

MAP 2:3

RAINFALL



By contrast, the coastal areas have a far less rigorous climate. Rainfall is much lower, particularly in South West Argyll, where there is less high ground to induce precipitation. Along the coast temperatures are higher in summer and the growing season is longer. The incidence of frost and of snow lying is much reduced and the climate is generally more favourable to agriculture,[5] although marginality decreases dramatically with height, as is shown by the low level of the tree line along the exposed west coast, where the effects of strong westerly winds are very evident (see map 2:3).

In some of the islands of the Inner Hebrides the low altitude, and consequent reduced precipitation, allows a much higher number of sunshine hours than elsewhere in the Highlands, especially in summer.[6] Indeed, such areas are sometimes among the sunniest in Britain, although Atlantic winds tend to reduce temperatures substantially. Arable farming is greatly facilitated in these areas, especially in Tiree.

In the lowland basins of Central Ayrshire, the Clyde and the Forth, rainfall is greatly reduced, averaging between 30 and 40 inches a year over considerable areas.[7] This figure is, however, greatly in excess of the average for most of the east coast lowlands. Oceanic influences are still pronounced however. The number of rainy days is high and the number of sunshine hours moderate, although temperature regimes are not extreme. Thus, Ayrshire and North Lanarkshire are still relatively marginal climatically for some crops, notably wheat, and the effects of even a moderate increase in altitude are considerable in terms of limiting the possibilities of agriculture. For example, the accumulated summer temperature in day-degrees from April to September is over 2,000 in the lower part of the Clyde valley, but this falls to 1700 at Lanark (640 feet) and to under 1500 in the Upper Ward at 780 feet.[8] Winter temperatures are relatively mild. For

instance, at Kilmarnock and Knockdolian (Colmonell parish) in Ayrshire, the mean daily temperature in January was 34.1 and 35.6 degrees F. between 1881 and 1918; significantly above freezing.[9] This, together with the abundant rainfall, tends to favour the growth of grass over most of the area while the relative lack of sunshine in the average summer is less conducive to crop production. The annual daily average sunshine hours at Turnberry is 3.77, a mere 31 per cent of the possible hours, and even in May and June this only rises to 39 per cent and 38 per cent respectively.[10] The mild climate means that the provision of winter fodder and the housing of livestock is far less of a problem here than in many other parts of Scotland.

On the uplands surrounding the lowland basins, rainfall increases steadily with altitude and the growing season shortens rapidly as temperatures fall. The moors which separate Central Ayrshire from the Clyde basin, and large areas on the fringes of the Southern Uplands, have up to 50 inches of rain annually, and in the higher hill country in close proximity to the west coast, in the Campsie Fells and especially the Renfrew Heights and the hills of Carrick, totals of up to 80 inches a year are recorded.[11] There is a pronounced rain-shadow effect in the lee of the Renfrew Heights, however, and precipitation in the middle and lower sections of the Clyde valley is reduced. Thus, while Greenock has an average annual rainfall of 61 inches, this falls to 40 inches at Paisley, at a similar altitude, and to under 35 inches further up the Clyde valley.[12] This shadow effect also extends to the higher moorlands in North Lanarkshire and Stirlingshire, which receive little more than 40 inches annually compared to 60-70 inches at comparable altitudes in the Renfrew Heights.[13]

In the Southern Uplands, elevation again increases rainfall. Due to the N.E. - S.W. alignment of the hills there is less of a rain

shadow effect away from the west coast. However, rainfall is not quite as excessive in the hills of Southern Lanarkshire as at a comparable or even lower altitude in the hills of Carrick. Only very localised areas of south Lanarkshire receive over 70 inches of rain annually and the valleys receive a good deal less; for instance, Crawford has only 43 inches.[14] Temperatures likewise fall with altitude in the Southern Uplands but even on the summits conditions are far less extreme than in the Highlands, and sheep can be wintered on the hills without difficulty. However, the effects of the upland climate clearly reduce the potential of agriculture in the valleys which dissect the hills. For instance, the number of days with recorded snowfall is around 15 a year at the mouth of the Clyde, 25-30 in the Lanark area, but as high as 40-65 among the hills at the head of the Clyde.[15]

SOILS

No general survey of the soils of the study area has been produced as yet and detailed Soil Survey memoirs are available only for limited areas. It is not within the scope of this work to attempt an overall analysis of the soils of the study area. It is proposed only to consider some of the more characteristic types of parent materials on which the soils have developed, and to examine some of their attributes in relation to agriculture.

Crystalline Rocks

Large areas of the Highlands consist of acid crystalline rocks which, when broken down into a soil, provide few plant nutrients. The heavy rainfall of these areas quickly washes away what nutrients are available. These soils require vast applications of fertilizer if they

are to be anything but poor pasture or, where surface peat has developed, ill-drained bog.

Raised Beaches

Raised beaches occur widely around the coastline of the study area, but vary considerably in extent and importance. They extend from over 120 feet above present sea level down to high water mark. Over large areas of the coast they are absent or poorly developed, but in some areas, particularly Argyllshire and the islands, they have long been important for cultivation. Indeed, the light, well-drained, easily worked soils of these beaches appear to have attracted the earliest agriculturalists.[16] The soils are variable in fertility, but in the past seaweed has often been available in considerable quantities in such locations as an adjunct to animal manure, and high yields of bere and barley have often been obtained.

Fluvio-Glacial Sands and Gravels

The break-up of the Pleistocene ice sheets resulted in the redistribution of much material which had been ground down by the ice. This debris was washed from the ice margins by streams which issued from the glaciers, and now covers large areas of lowland Scotland, although its distribution is often patchy and intermixed with other deposits. The material is well-drained, but not necessarily naturally fertile. These lands are light and are therefore well-suited to the growth of turnips. These easily worked soils will, with the aid of manure, produce tolerable crops. They are particularly valuable in the Highlands where alluvial fans are sometimes found interspersed among the less fertile crystalline rock debris.

Till

This category covers a wide variety of soil constituents which vary

in fertility depending on the parent material from which they were formed. In general they are poorly drained and heavy so that if they are to produce good crops they require careful drainage and the use of a heavy plough. Such soils frequently produce lush pasture, and are usually considered to be ideal for stock farming. Till is often associated with uneven, drumlin topography which renders ploughing extremely difficult. Such soils frequently benefit from lime and with its aid can be made quite fertile.

Alluvium

The alluvial flood plains of the larger rivers in the study area, particularly those of the Clyde and its larger tributaries, have long been important as some of the most fertile land within the area occurs here. However, such land is often difficult to drain and is liable to flooding. Indeed, in its basic characteristics and qualities, though not in its origin, such land is very similar to the carselands. Like the carses, alluvial land is also of fairly restricted extent.

Carse

The carselands of the Forth valley consist of very fine estuarine clays which were deposited during the late glacial period. They were buried by a deep blanket of peat and remained covered for the most part until increasing interest in their agricultural potential during the later eighteenth century led to systematic reclamation by the removal of the peat and drainage.[17] When adequately drained they proved to be extremely fertile and formed some of the highest-yielding grain lands in the study area during the period under consideration. However, they have mainly been converted to permanent pasture during the late nineteenth and twentieth centuries.

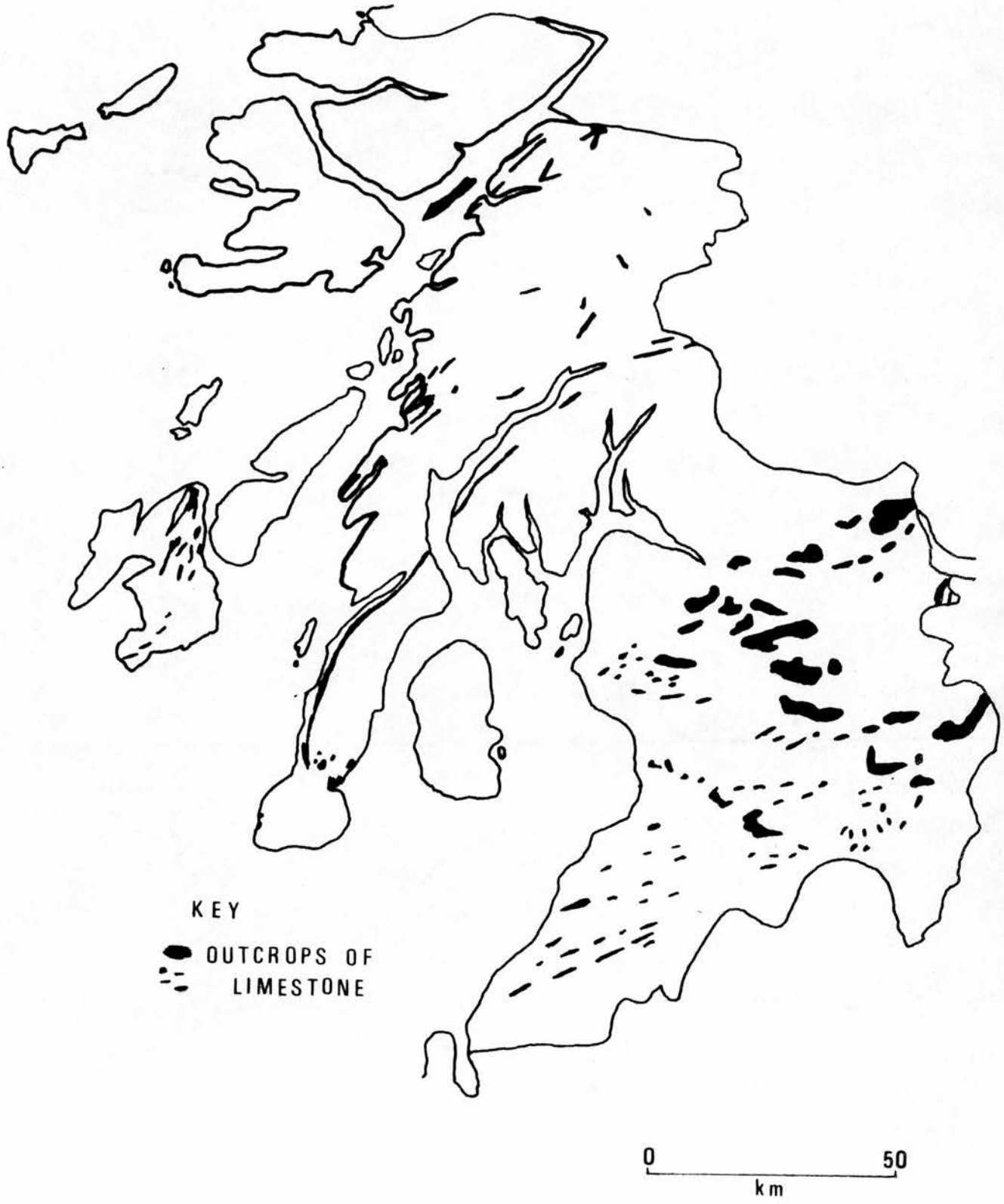
Peat

Peat was formerly very extensive in both upland and lowland situations. It has been cleared over the centuries, particularly in the lowlands, for fuel and as a means of improving soil fertility. In some areas, such as the upper Forth valley, raised peat moss accumulated to a depth of 15 or 20 feet. Peat itself can be very fertile as it is rich in humus and plant nutrients, as in the Fenlands, but in Scotland the deposits are almost entirely of the acid type. Considerable quantities of peat remain today in the upland areas as thick blanket peat on the gentler summits and as thin hill peat on slopes. Such localities are so remote and climatically extreme that the clearance of this peat would not be economic. Such land exists as poor sheep pasture, grouse moor and deer forest, as well as having, in modern times, an important recreational role.

Although the parent materials which have been described are diverse, the soils produced from them have some common features which reflect the climatic characteristics of the study area. On the lower ground podzolic soils are frequent, due to leaching resulting from heavy rainfall and the infrequency of very dry summers to cause an upward movement of water in the soil. As a result of leaching the soils are not naturally highly fertile. The conditions of abundant water and relatively low temperatures led to the accumulation of acid organic material in the soils. Thus, the most consistent characteristic of soils in the study area is their tendency towards acidity. This explains the importance which liming has played in the agricultural improvement of the area for both arable and pastoral farming (see map 2:4). The abundance of rainfall results in soils on gently sloping

MAP 2:4

LIMESTONE



ground, without free drainage, at any altitude, being subject to waterlogging. Thus effective drainage, whether at a local level or on a larger scale, has always been of critical importance to the success of agriculture.

AGRARIAN BACKGROUND

Little is known of the early history of agriculture in Scotland, although Neolithic peoples settled there and practised agriculture, in what must have been a hostile and marginal environment.[18] It is probable that the first settlers were pastoralists rather than arable farmers. However, at Pitnacree in Perthshire, the soil beneath a round barrow is thought to have been cultivated prior to 2,800 B.C.,[19] and a series of barrows along the Tay valley, possibly of similar age, are sited on lower river terraces which would have been suitable for arable cultivation.[20] The preference of the Neolithic settlers for light soils has long been recognised.[21] Fertile and easily-tilled soils are found on the raised beaches of western Scotland, and it is suggested that they would have been attractive to early settlers, especially as the alternative was frequently heavy boulder-clay.[22] Tomb distribution in some parts of Scotland has suggested an avoidance of the richer, heavier soils, and cairns are often situated close to the upper limit of present-day arable land.[23] It has been suggested that this may relate to these soils having been covered with vegetation which was relatively easy to clear.

On the other hand, Renfrew's work on Arran, with a physical environment similar to many parts of the study area, has shown a close correlation between the distribution of megalithic chamber tombs and the extent of cultivated land during the nineteenth century.[24] It

is clear that Scotland was not an area in which prehistoric agriculture was pioneered; indeed it was one of the last places in Europe to adopt new ideas. It lay at the frontier of the Roman Empire and was considered to be part of the barbarian fringe. Bearing in mind the physical characteristics of the country, none of this is surprising. There were more fertile, more hospitable areas which lent themselves more readily to agrarian experimentation and innovation. Nevertheless, there were Scottish farmers even in prehistoric times, and they were the forerunners of those who practised the sophisticated techniques in use by the nineteenth century.

From the withdrawal of the Romans from Britain until the Anglo-Norman penetration of Scotland, little is known of Scottish agriculture apart from scattered pieces of information gleaned from the near-contemporary biographies of the early Saints. In St. Columba's Iona, at around 500-600 A.D., grain was grown and processed, and milk was produced.[25] The mixed farming economy of the Northern Isles has been partly reconstructed from the excavation of Norse settlement sites such as those at Underhoull and Jarlshof.[26] However, we have no means of knowing how representative these practices were of the remainder of the country.

During the twelfth and early thirteenth centuries, Scottish kings such as Malcolm IV and David I introduced the feudal system into Scotland, along with an Anglo-Norman aristocracy which replaced the old Celtic mormaers over much of the country.[27] The classic feudal system was never introduced with total success, and most of the Highlands remained unaffected by this influence.[28] Nevertheless, feudalism persisted longer in Lowland Scotland than in England and still formed the basis of the landholding system during the period of study. The gradual increase in the quantity and quality of the

documentary source material allows one to build up a generalised, slowly changing picture of the type of agriculture which, from this time until the eighteenth century, was characteristic of the whole country though, inevitably, with disinctive regional variations. Most of the land was held in estates of varying size; crown, ecclesiastical and lay estates in the earlier period, and only lay estates at a later date. A rural middle class failed to develop to a significant extent, and apart from certain localised areas, the small owner-occupier did not play an important part in rural society.[29]

Most of the land was tilled by tenant farmers working jointly to furnish a common plough team, and undertaking in co-operation all the major operations of agriculture.[30] The tenants, with their sub-tenants and farm servants, lived together in farm townships, or ferme touns as they were known. This remained the characteristic form of rural settlement in Scotland until the Agricultural Revolution.[31] The arable land was universally organised in open fields on an infield-outfield system.[32] The infield received most of the farmyard manure and tended to be cropped almost unceasingly with cereals, mainly bere and oats; while portions of the outfield, after having the township's cattle folded on them for a period, would be cropped with oats for a few years until yields fell to such a low level that the land had to be left to recover. The arable land was divided into strips; those of the individual tenants were scattered throughout the parcels of open field land in a system which, at an early date, appears to have involved periodic re-allocation and which later became known as the runrig system. Because of the limitations of drainage technology the land was ploughed ridge and furrow, especially on heavier soils, to prevent waterlogging. Farming practice varied in detail from one area to another, as did the balance between arable and pasture. The west of

Scotland seems to have concentrated on pastoral production from an early date just as the eastern lowlands specialised in arable farming.[33] However, due to the limitations of transport and the marketing system, regional self-sufficiency persisted until a relatively late date, and some cereals were raised in most areas, often in very marginal conditions.[34]

Commercialisation in agriculture was slow to develop. In the fifteenth and sixteenth centuries, Scotland was engaged in protracted and ruinous wars with England, as well as having to endure intermittent internal strife on a major scale. The Borders still formed a frontier area, periodically devastated by war, while those parts of the Lowlands which bordered the Highlands had to be maintained on a permanent paramilitary footing to protect themselves from incursions from behind the Highland line.[35] The early seventeenth century, under James VI, was a period of peace and modest prosperity during which the agrarian economy began to develop slowly but significantly.[36] The troubles of the Civil Wars proved a setback but the Restoration in 1660 ushered in three and a half decades of peace and prosperity during which the economy became steadily more commercialised.[37] The export of grain flourished in favourable years and the droving trade with England grew to reach an important position in the Scottish economy.[38] Despite economic setbacks in the 1690s, the character of agriculture in Scotland during the later seventeenth and early eighteenth centuries was slowly changing. Growing commercialisation was reflected in the gradual commutation of rents in kind to money payments,[39] and the progressive enclosure of the policies and home farms of the landowners,[40] the effects of which are shown on the Military Survey of the late 1740s.[41] A series of statutes passed by the Scottish Parliament between 1661 and 1695 paved the way for the sweeping changes in the agrarian landscape which

occurred during the later eighteenth century.[42] The early eighteenth century saw the first experiments with sown grasses and root crops as the new techniques which were spreading in the Low Countries and South East England slowly diffused northwards.[43]

The growth of demand for agricultural products both from expanding urban centres at home and from abroad encouraged agriculture to become increasingly intensive and market-oriented. In order that full advantage be taken of this situation, agriculture had to improve from the inefficient infield-outfield system. This was accomplished in different ways and at different rates in various parts of the country. More land was brought into cultivation, new crops and improved varieties of old ones were introduced, and new fertilizers were experimented with. The structure of agriculture was changed to take full advantage of these improvements. Land was consolidated and holdings amalgamated from runrig. The old ferme touns were broken up and new large farmsteads created. Instead of the under-capitalised joint tenants a smaller, more prosperous class of substantial tenant farmers emerged. Increasingly sub-tenants and cottars lost their modest stake in the land and became landless labourers.[44]

Various arable systems which allowed the almost continual cropping of the best land were developed and, with the spread of enclosure, the infield-outfield system declined. These changes were fostered by increasing industrialisation which drew many people from the land and created large markets for food. It also increased prosperity so that there was a greater demand for a wider variety of foodstuffs. Improved road transport from the mid-eighteenth century enabled produce to be moved over greater distances at lower costs and with less damage, as well as opening up previously remote areas for commercial production.

These trends were later intensified by the coming of the canal system, and particularly of the railways.[45]

By the early eighteenth century Scotland was becoming increasingly involved in trade with England,[46] and from that time onwards the economies of the two countries became ever more closely inter-linked. By the end of the eighteenth century, although regional isolation continued in some areas, Scotland was largely involved in the British economy, and was affected by economic, social and political factors which influenced the whole of Britain. Scottish farmers responded to the same changes as did English ones, although local circumstances caused different effects in different areas. However, there was a national economy rather than a series of regional ones, and even very remote areas entered into this to some extent.

By the 1870s Britain had ceased to be an important agricultural producer, although her industrial supremacy was still largely unchallenged. Increasing quantities of food were imported from those countries which had a greater geographical advantage in the production of certain foods. The 1870s had begun well, but by 1874 a slump hit most of the industrial nations, and affected Britain's agriculture as well. When the world situation improved poor harvests depleted farmers' profits, for foreign competitors were able to send in food, thus preventing the price rises which would have compensated the farmers.[47] The corn areas were first to suffer, and the adverse seasons were at first blamed for the situation.[48] However, in the light of the Richmond Commission's Report in 1882 it became clear that deflated prices were to be permanent and both corn and livestock prices were depressed. Cheese and butter were imported, together with frozen and tinned meat.[49] There followed a period of retrenchment and rationalisation and with better seasons

after 1884 the situation began to improve, especially for the larger and more capable farmers.[50] British farmers turned to fresh milk for this gave a better return than butter. Denmark, the Baltic states and Eire had become major butter producers, and they had set standards of quality and uniformity to which few British farmers aspired. Poultry and market gardening also grew in importance at the turn of the nineteenth century,[51] and high quality meat could compete with the poorer imports. The early twentieth century was a period of "quiet but growing prosperity for farmers".[52] They had come to terms with competition and although their weaker elements had gone to the wall, the industry as a whole continued in a reasonably healthy state. It was accepted that Britain would import most of her food, and that this would be paid for from the profits of manufactures which were exported. It was thought that agriculture would be allowed to continue its decline. It was an unprofitable source of income, and for the worker it involved hard work, long hours, poor pay and low status.

However, when war broke out in 1914, it became clear that Britain's foreign supplies of food were in danger of being cut off. Imports were obtained only at the cost of heavy losses in men and shipping, and it became clear that home production of food would have to increase markedly. At first it was thought unnecessary to change the system of food production, but as the losses of shipping became more severe, British farmers were called upon to feed the nation. A committee was established under Lord Milner to investigate the situation and it made several recommendations which were not at first implemented by the government.[53] However, in 1916 the American harvest was deficient, and measures were finally taken to increase Britain's output of corn and potatoes. Agriculture laboured under a severe shortage of men

(especially skilled workers), of equipment and of fertilizers, but was called upon to extend cultivation and to increase output. Committees were established with power to force the ploughing up of grass and to take over inefficient farms. Farmers were enjoined to plough up pasture, and to produce as much food as possible in the national interest.[54] British agriculture responded remarkably well to the situation, and when the war ended the government resolved that agriculture should be maintained at a level which would enable it to supply a considerable amount of the nation's food in the event of emergency. The benefits of a balanced economy were recognised, and in order to foster agriculture, grants and subsidies were made to farmers for uneconomic ventures and to encourage the cultivation of certain crops. Nevertheless, it was accepted that agriculture would remain at a low level in comparison with its nineteenth-century position. However, during the Second World War, farmers were once again called upon to play a major part in the war effort, and although in 1945 agriculture reverted to its pre-war position, the protection continued as a means of safeguarding the home producer and encouraging him to continue farming. The system of subsidies became increasingly complicated during the post-war period, and they were also given on basic commodities in order to keep their price down. Although the plan that British agriculture should not be allowed to sink below a certain level has remained, the idea of potential national self-sufficiency has been replaced by that of self-sufficiency within the European Economic Community. As a member of the E.E.C. Britain has had to subjugate her small-scale interests to those of the wider entity to which she now belongs. This has involved considerable opposition from British farmers and has meant falling profits for some of them. It is hoped, however, that these are teething troubles which will be resolved in due course.

AGRARIAN BACKGROUND - CONCLUSION

This is a short, personal and simplistic summary of the whole sphere of agriculture over about four thousand years. The development of farming has been slow and sometimes painful. It would seem that the golden years of agriculture lay in the time when it had become fully market-orientated, but had not felt the effects of large-scale foreign competition; at a time when home-produced food supported the foremost industrial nation. Not only was agriculture able to do this, but it was practised on the principle of high but maintained levels of fertility. Agricultural systems were designed to maintain fertility indefinitely, rather than to obtain spectacular short-term returns at the expense of the land and of the future generations who would depend on it. These developments took place during the period of study.

TRANSPORT

Transport is vital to commercial undertakings as it provides the means of linking producer and consumer. If it is poor, the distance over which goods can be moved is severely curtailed, either because the cost of transport renders the movement of goods unprofitable or, in the case of perishable commodities, renders them useless. In Scotland, until the later eighteenth century, there were two main methods of moving goods: by road and by sea. Both of these means of transport were relatively inefficient and poorly developed.[55] The improvement of transport by both land and sea was a fundamental part, and indeed to a great extent a precondition, of the Agricultural Revolution in the area under study.

Road transport was difficult before the second half of the eight-

eenth century because of the inadequacy of road maintenance. The statute labour system which was used was ineffective.[56] The price of commodities whose value was low in relation to their bulk, such as grain, could be so increased so as to make their movement overland uneconomic.[57] Thus the production of commercial surpluses of many commodities was restricted to those regions within a short distance of the coast.[58] Coastal shipping, although far cheaper than overland carriage, also presented problems: cargoes could be ruined by salt water, and total disaster was not infrequent.[59]

From the middle of the eighteenth century, the mechanisms of transport began to improve. The turnpike trusts greatly raised the quality of road construction, although their effects were variable. Road engineers like McAdam, one of the trustees for Ayrshire, revolutionised road-building techniques within the study area, which was a pioneer in Scotland in this respect.[60] By the early nineteenth century a network of good quality roads had been laid down in the area.[61] These roads were of the greatest benefit to agriculture, particularly as canals played a relatively minor role in the transport revolution of the west of Scotland compared to many parts of England. The importance of roads in opening up commercial horizons for inland agricultural producers is often stressed in sources.[62]

Artificial inland waterways - canals - gained popularity in England in the mid-eighteenth century, and many miles of canal were constructed in the later part of this century.[63] Canals came later to Scotland and the landscape was less well suited to them. The canal era nevertheless had some impact on the agriculture of the study area.[64] Of the major canals which were constructed in the west of Scotland, the Monkland canal was designed primarily to serve the needs of the coal and iron industries,[65] while the Glasgow-Paisley-Johnstone canal became

primarily a passenger carrier.[66] The Forth and Clyde canal, and its later extension the Union canal, were more significant in agricultural terms, however. The former allowed the transport of lime, and especially town dung, to locations which would otherwise not have been able to obtain them economically.[67] These two canals also facilitated the transport of grain from the Lothians to the rapidly growing urban centres of the Clyde, to some extent taking pressure off the west of Scotland to produce grain.[68] The Crinan canal was designed to cheapen the transport of produce from the West Highlands to the Clyde and to encourage agriculture, fishing and industry. In this, however, it was barely successful.[69] The rugged topography of the study area and the concentration of population and industrial activity in a few centres by the early nineteenth century did not encourage the construction of a proper canal network, and until the coming of the railways it was the improved road network which was most significant for agricultural development.

The early Scottish railways were mainly constructed to serve the coal and iron industries.[70] Progress of railway construction in the study area was slow until the later 1840s, as can be seen from Table 2.1,[71] although the first railways were opened in England in the 1830s after the success of Stephenson's 'Rocket' at the Rainford Trials in 1829.

During this first boom phase the major urban centres of western Scotland were linked and Glasgow was connected with both Edinburgh and England.[72] A second wave of railway construction in the early 1860s saw the opening up of many rural areas, such as South Ayrshire and Western Lanarkshire.[73] The final phases of railway construction in the study area lie outwith the period under consideration, however. It was only at the end of the nineteenth century that the West Highlands

were penetrated by the railways and many of the remoter rural areas of South West Scotland connected to the main network by light railways.[74]

Table 2.1 Acts of Parliament relating to railway construction within the study area

Period	Number of acts passed
1825-30	6
1831-35	2
1836-40	2
1841-45	5
1846-50	21
1851-55	4
1856-60	4
1861-65	13
1866-70	0
1871-75	2

Source: Carter, E.F., An historical geography of the railways of the British Isles (1959)

The impact of the railways on agriculture within the study area must have been considerable, yet relatively little can be said about it at the present time. The main phases of railway construction fall in periods which are sparsely covered by the sources which have been used for this study. There are vast quantities of railway source material which have yet to be studied, but their bulk and specialised nature prevented their use for the background to a topic such as this one. This material awaits a separate, detailed investigation.

However, it must be remembered that, prior to the days of the internal combustion engine, a railway only opened up a relatively narrow belt of country on either side of it.[75] Many parts of the study area, South Ayrshire and South Lanarkshire for instance, were served

by a very sparse network with few branch lines. The Highlands were scarcely served at all during the period of study. Nevertheless, the railway network was most dense in the areas whose agricultural potential was probably greatest: the Lower Clyde Valley, Central Ayrshire and parts of Stirlingshire, and they must have greatly facilitated the marketing of produce, as well as the transport of the raw materials which were needed by agriculture.

Coastal shipping also underwent significant developments in the period under consideration and this had its effects on the agricultural economy of the study area. Coasting vessels were used to bring high quality lime from Northern Ireland to the Ayrshire coast by the late eighteenth century,[76] at cheaper rates than locally-produced lime. The main development during the period of study, however, was the advent of the steamship. Although they were first used mainly for passenger transport, they encouraged the quickening seasonal flow of migratory labour from Ireland to help with the Scottish harvest,[77] and eventually brought considerable numbers of Irish immigrants to settle within the study area and take up both agricultural and industrial occupations.[78] They also brought the Highland part of the study area into much closer contact with the Clyde by way of the Crinan canal and must have aided the dissemination of new ideas into the area, as well as encouraging the outflow of migrants to the Lowlands, to the urban areas, and abroad.[79]

Chapter 3

L E A S E S

INTRODUCTION

A lease or tack is a formal agreement between the landlord and tenant of a farm, mill, or feu, or of mining and fishing rights.[1] Many written leases have survived in estate collections, and further information about them can be obtained from the Statistical Accounts and Agricultural Reports. They provide a useful insight into agricultural practice, for in the nineteenth century most tenant farmers had leases.[2] In the nineteenth century, as before and since then, the majority of Scottish farmers were tenants, and thus leases are central to a study of the agriculture of the period.

It was decided to devote a whole section of this study to leases. It would have been possible to include the information from them in a variety of chapters, for instance crops, rotations, services. However, it was felt that the lease itself was worthy of consideration; indeed, the granting of leases was seen by some contemporaries as the chief cause of improvement.[3] Many of the conditions of leases are a reflection of agricultural practices, often at a local level, but they are indicative of what ought to have been done and thus differ from the Statistical Accounts and Agricultural Reports, which are descriptions of actual practice. Some such conditions are specific,[4] but others merely give a clue to the sort of management which obtained.[5] Thus it was thought unwise to consider the information contained in leases together with other systematic material. Provided it is realised that

leases are a special case, it is possible to obtain much useful information from them.

It is hard to discover how far leases were adhered to. Jones considered that in England lease covenants had ceased to have any meaning after 1850, and pointed out that tenants began to amend the cropping systems stipulated.[6] It is invalid to assume that this was necessarily true in Scotland. In Scottish leases at this time it was usual to stipulate a money payment as an alternative to a particular practice.[7] This was considered as an additional rent, not as a punitive measure.[8] The proprietor was giving the tenant an alternative. The lease covenants reflected current thinking on the best methods of management, and the proprietor ensured that the tenant either used these methods, or paid for the damage that different practices might cause. Viewed in this way the lease covenants cannot have been meaningless; whether the tenant chose to use a more exhausting method of farming and to pay a higher rent, or to observe the clauses and pay the rent stipulated, he was bound by his lease. The proprietor either had his farm as he wanted it, or got compensation for it being otherwise. Few references to lease-breaking have survived,[9] and it is unlikely that it was widespread. For the purposes of this study, the degree to which management clauses were observed is unimportant, for they are used as an indication of agricultural thinking, not as a record of detailed farming practice.

SURVIVAL OF LEASES

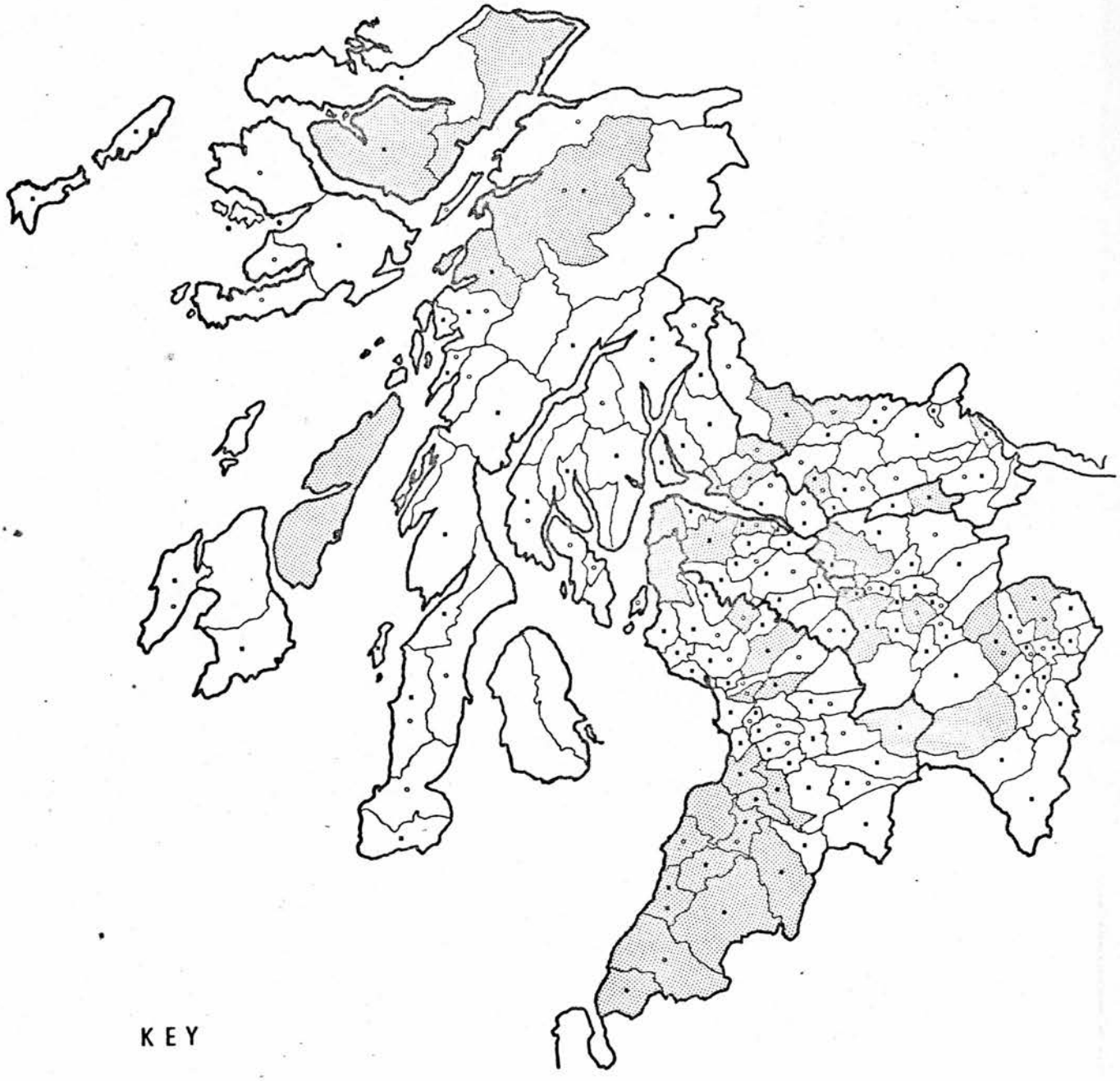
In common with all material relating to estate management, leases have survived only in a piecemeal way. For certain estates many leases are extant,[10] whereas for others there are only one or two.[11] In

general a low percentage of nineteenth-century leases has survived. Those studied were drawn from 37 estate collections, and c.45 parishes over a wide area (see Map 3:1).

From the inventories in the S.R.O. it is clear that more leases from the seventeenth and eighteenth centuries have survived. There is no specific reason for this, but several possibilities exist. In the seventeenth century written leases were only just beginning to become general,[12] but by the nineteenth century they were commonplace. Earlier leases were short and in complicated calligraphy, whereas from the later eighteenth century leases were bulky documents written in a clear hand or printed. It is possible that in earlier periods leases were kept because of their novelty value, low bulk and superficial similarity to other legal documents, such as charters and sasines, which had to be retained indefinitely. They probably survived the later period because of their compactness and unfamiliar handwriting, and possibly because they were stored in the muniment-room, while by the nineteenth century they were often kept in the estate office. Increasing volumes of paper must have rendered periodic tidying necessary, and being working documents, leases would have been destroyed when they expired, whereas material in the muniment-room might have been left intact. Some later leases were printed in standard form,[13] so that it would have been necessary to keep only one copy for reference. Another problem is the late recognition of the value of estate documents in historical research. Many of the collections which arrived early to the S.R.O. do not include nineteenth-century estate papers because they were not regarded as having any historical interest.

MAP 3:1

SOURCES YIELDING LEASE DATA



KEY

PRIVATE ESTATE MUNIMENTS

O.S.A.

N.S.A.

0 50
km

PRODUCTION OF LEASES

Although written leases were general on most estates in Scotland,[14] many tenants in England refused to accept them. Landlords too were wary of them because leases prevented them from getting higher rents when conditions were good but did not prevent tenants from obtaining an abatement when they were bad.[15] In Scotland abatements were granted at the discretion of the proprietor,[16] usually because it was in his interest to accept a lower rent rather than to have a tenant go bankrupt and leave the farm. In England the absence of leases did not necessarily involve insecurity of tenure, and many farming families continued for generations without a lease.[17] This also applied to those Scottish tenants who had no lease. However, the nineteenth-century Scottish agricultural improvers had little doubt that leases were vital to agricultural improvement and well-being,[18] and Chambers and Mingay agree that security of tenure and compensation for unexhausted improvements contributed to better farming.[19] A farmer with security of tenure would have been more willing to spend money on improvements from which he, and eventually the proprietor, would benefit, and the farm would thus have been able to support a higher rent and provide bigger profits. The proprietor would have had his interests circumscribed and protected, while the tenant would have had a written account of the proprietor's obligations to him.

Although the interests of landlord and tenant were bound closely together, they were often discordant.[20] The proprietor would have wished to lay out as little money as possible, but to obtain a high rent and to prevent damage to the land. The tenant wanted to place the burden of improvement on the landlord, and to take as much from the land as it could bear, particularly when the lease was drawing to a

close (the proprietor would have had to pay for restoring the land to fertility, or to have accepted a lower rent from the tenant for a new lease). The lease was a compromise between the interests of the two parties although, being drawn up by the proprietor (or his agent), leases may seem weighted in favour of the landed interest.[21] There are, however, examples of the tenant arranging things to his advantage.[22] There were benefits for both landlord and tenant in the granting of a well-constructed lease.

A lease is an official document, binding in law, and therefore written in a formal style, incorporating many standard clauses. Aiton observed that their style often rendered leases unintelligible.[23] There is, however, a marked diversity in the ideas and sentiments contained in them, and they were obviously tailor-made to the specifications of each proprietor,[24] and to suit local circumstances.[25] This is emphasised by the similarity between the leases of individual estates.[26] Thus it is perhaps not too serious that few tacks have survived in some collections, although care must be taken not to give undue weighting to a particular clause in a batch of leases simply because of their high survival-rate. Although they are far from uniform, there are great similarities between leases. From a comparison of those in private estate collections, it is possible to describe the typical lease, although individual ones may not contain all the clauses (see Diagram 3:1).

The contemporary agricultural writers offered advice to landlords on the drawing up of leases, and recommended that these should be adequate to protect the land, but flexible enough to encourage enterprising tenants. Sinclair and Kames are perhaps the doyens of such writers, and it is interesting to note that the clauses which they advise are those which were included in many leases. It is unlikely

Diagram 3:1

THE TYPICAL LEASE

1. Name of parties and of land to be let
   (and parts, pertinents etc. - sometimes specified).
2. Length of lease and date of entry
   (usually Martinmas for crops and Whitsun for houses).
3. Rent
   (money and services and carriages, kain etc. - if any - and burdens and penalty for failure to pay).
4. No subletting
   (void in case of bankruptcy, and other clauses to protect proprietor).
5. Reservations of proprietor
   (woods, feus, minerals, game, excambion).
6. Obligations of proprietor
   (only if stipulated eg. to build or repair houses, fences etc., to provide lime or dung).
7. Obligations of tenant
   (only if stipulated eg. to maintain or build houses or fences, to drain and to enclose. Cropping and manuring restrictions).
8. Regulations with respect to removal
   (entry of new tenant, planting of grass for him, sale of outgoing crop, leaving of straw and manure, penalty for non-removal).
9. Penalty for infringement, binding on both parties.
10. Legal clauses of intent to register tack in books of session.
11. Signatures of parties.

that they were instrumental in formulating leases, for those clauses were included in mid eighteenth-century leases and even in some seventeenth-century examples, while Kames did not write until 1776, and Sinclair not until 1813 and 1814.[27] However, the example of these writers may have encouraged some proprietors, or entrenched others in their beliefs, and served as a synopsis of ideas taken from other sources. It is likely though that the writing of leases owned more to tradition and experience than to the reading of agricultural treatises.

LEASE COVENANTS

It is useful to examine the individual stipulations of leases in detail, for these shed considerable light on the agriculture of the period. It was obviously important that a lease should exclude 'assignees and subtenants',[28] so as to ensure that the land would not be subdivided. In 19-year leases the right of subletting was not implicit, but in those of 2 x 19 years or longer subletting was permitted unless otherwise stipulated.[29] It was also normal to reserve all mining and mineral rights to the landlord, and it was greatly in his interest to do so, especially at a period when many landowners were making their fortune from these resources.[30] The tenant was protected by being allowed compensation for the damage which these operations caused.[31] It was also usual for the landlord to reserve power to alter boundaries and roads, to grant feus, and to plant and cut timber. The amount of land which could be thus resumed was often restricted, but again the tenant was to receive compensation for it.[32]

The tenant normally entered a farm at Martinmas for the crops

and Whitsun for the houses and grass. After harvest the old tenant had no further need of the arable ground, but required time to dispose of the crop, and needed winter pasture for his stock. The new tenant at his entry was allowed to prepare the ground for the succeeding crop, but he did not gain full possession of the farm until Whitsun. The out-going tenant was required to leave the straw and dung of the last year for the new tenant on payment of its value. If it had been received free at entry, it had to be left in this way at expiry. Thus the transition from old to new tenant was gradual, and involved less inconvenience to both than removing at a specific date would have done.

The reservation of game and fish was less fair, because the tenant had no redress for damaged crops etc. Sinclair recommended that recompense be given for damage to the land,[33] but such a stipulation was rarely included.[34] Agreements regarding the construction of fences, drains and farm buildings were various, but the tenant was bound to maintain such structures once they were built. In order to ensure that this was done, the proprietor retained the right to make repairs if the tenant failed to do so, and to add their cost to the rent. An additional protection which was sometimes included was to bind the tenant to insure the farm buildings against loss by fire.[35]

Sinclair was adamant in his condemnation of services,[36] and those ministers who mentioned them in the Statistical Accounts were unanimous in their disapproval of them.[37] Yet services continued well into the nineteenth century.[38] It is probable that local circumstances and/or conservatism made their survival possible in some areas. Although there are nineteenth-century examples of labour services, it was chiefly carting that had survived.[39] It was probably most convenient for a proprietor to retain carting by his tenants, as an easier and cheaper way of getting the work done when he wanted it than employing

professional carriers. The work could have been done at a slack time of the year (seed-time and harvest were specifically excluded), which would not have inconvenienced the tenant too much. The continuation of such services would have been particularly important in remote areas where professional carriers were few and expensive.

As well as smoothing the transfer from old to new tenant, the insistence that straw and dung made on the farm should be left to the incoming tenant at a fair price was a way of protecting the farm and, indirectly, the tenant. If an alternative source of manure was available it was sometimes possible to substitute this.[40] At the end of a lease there was generally a clause stating the additional rent payable by the tenant if he refused to remove at the end of his lease, and stipulating a fine, binding on both parties, for infringement of the lease. No evidence has come to light to show whether or not these two clauses were observed.

MANAGEMENT CLAUSES

In most leases the proprietor imposed some restrictions on the management of the farm. This was a safeguard against the land being damaged or outrun, and fostered good agricultural practice. Too loose a stipulation allowed the tenant to overwork the farm, while a total lack of covenants meant that it could be completely outrun.[41] In the early days of agricultural improvement it was necessary to stipulate a strict rotation of crops, for until then it had been common to take up to five or more white crops in succession on the infield, and farmers were loath to break with old habits.[42] As the tenants themselves became more skilful, it was unnecessary to use as many restrictions, and it was usual to stipulate the management for only the

last four or five years of the lease.[43] Clauses which were too specific sometimes bound the farmer to an outdated or ill-formulated system of management.[44] A competent tenant would have been most likely to take on a farm of which he had considerable choice in the management. Proprietors must have learned from one another and from experience which clauses were most suitable for inclusion in leases. The ideal lease would have had neither too many nor too few restrictions.

Argyllshire

In Argyllshire in 1813,[45] and in the Hebrides in 1794,[46] leases generally had no covenants at all. In the Old Statistical Account only the Duke of Argyll's leases are mentioned as including clauses to foster improvement,[47] but several contemporary leases include fairly detailed stipulations. For instance, on Campbell of Barcaldine's lands the tenants were bound to follow certain restrictions. In a 16-year lease of Ferlochan in Ardchattan from 1791,[48] no more than three white crops were to be taken in succession, a third of the wintertoun was to be pastured yearly, and no more land was to be broken up in the last three years than was usual. The tenant was to drain the mossland, and to lay down at least eight tons of 'limestone' or an equivalent quantity of shell-sand per annum. The proprietor was prepared to give £10 worth of shell-sand during the lease. On a croft let for 14 years in 1816,[49] a four-course rotation was to be observed: 1/oats, 2/potatoes, 3/oats or barley with grass, 4/hay. At least 50 carts of dung or compost per acre were to be laid on the land intended for potatoes. On the farm of Balour, let for 19 years from 1817,[50] the tenant was to improve as much land as possible, and to have the arable under rotation during the last five years. The rest of the farm was to be under: 1/oats, potatoes or turnips, 2/barley

with grass, 3/hay, 4/hay or pasture, 5/pasture. Every second green crop was to be limed with 100 bolls of lime per acre. In three leases for Auchinruir for 12 years from 1821, 1828 and 1828,[51] the restrictions were less specific, and merely stated that no two white crops were to be taken in succession, and that a third of the arable was to be left in pasture at expiry.

On the Breadalbane estates too a specific system was used. In the five year leases given to tenants of Netherlorn from 1800,[52] a regular rotation was laid down, no two white crops were to be taken in succession and no more land worked in the last two years of the lease than in the first two. Every second crop was to be manured. On the crofts let in 1803,[53] one acre of land was to be taken in yearly, if there was any land capable of improvement; while in Upper and Nether Ardlaroch in Luing (let for 19 years from Whitsun 1814)[54] mossy lands which the proprietor drained had to be brought into cultivation. The cropping was not restricted until the last five years, when the arable and improved land was to be cropped under the following rotation: 1/green crop or fallow, 2/barley with two bushels of perennial ryegrass and 15 pounds of clover, 3/hay or cut clover, 4/ pasture, 5/oats. Similarly in the lease of Ardentrive in Kilmore and Kilbride,[55] a five shift system was stipulated for the last five years, and all tenants and cottars of Netherlorn were to observe the same rotation except on crofts of less than five acres.[56] On these small holdings there was to be a quarter in green crop, a quarter in barley with grass seed, a quarter in grass and a quarter in oats. The same system operated when new conditions of lease were printed in 1837 for Netherlorn[57] and Glenorchy.[58] In the New Statistical Account it was observed that these conditions were enforced under regular heads of

lease even on lands let only for one year.[59]

In Campbell of Jura's leases, however, the cropping clauses were more general. The arable of the farms of Ardmenish and Kinnackbrack, let for 19 years from 1795,[60] was to be worked regularly, especially in the last seven years, when no more grass was to be broken than in previous years. In the general conditions of lease for tenants in 1854[61] no two successive white crops were to be taken, a fifth of the arable was to be left in lea at removal, and the sheep were to be smeared with tar and butter in October/November. For cottars at the same date, regulations were more specific.[62] If they had no cows all the arable was to be under potatoes, if they had cows, half of it was to be so.

The evidence from the large estates in Argyllshire indicates that proprietors were aware of the necessity of preventing white crops from being taken in succession, and of maintaining the land in good heart by use of manures. Sown grasses and some green crops were used together with the traditional grains, oats and barley. Leases enjoined tenants to practise a modern system of farming, and encouraged them to bring new land into cultivation where this was feasible. Proprietors sometimes gave assistance to tenants by providing manure, but generally they used leases as a means of encouraging better farming. It cannot be assumed, however, that such advanced methods were in use on the smaller estates, although it is clear that some knowledge of improved practices had penetrated into the remote areas. More widespread use of modern methods may have developed from this introduction.

Ayrshire

In New Cumnock, leases bound tenants to improved methods of farming including regular rotations.[63] There is little other information on the

management clauses of Ayrshire leases apart from the actual stipulations in tacks. Many of these dictate a detailed system of management. In Dounan and Holmpark,[64] Ballantrae, the rotation was to be: 1/ley, 2/drilled green crop, 3/white crop with nine pounds of clover and 1½ bushels of rye-grass per acre, 4/pasture, 5/pasture, 6/pasture, while in three leases from Stewarton[65] for 1783, 1786 and 1786, it was stated which enclosures could be ploughed up in any year. In several Cunninghame leases for Kilmaurs and Kilmarnock,[66] it was stipulated in which years each enclosure could be cropped or pastured, although detailed rotations were not given. Three Kennedy leases[67] include individual conditions, which appear to have been suited to the specific farm in question. In Glaich and Haggstone, let for 24 years from Whitsun 1849, the rotation for the lowlands was to differ slightly from that for the high arable. The former was to be: 1/oats from lea, 2/potatoes or turnips, well manured with 30 tons of dung per acre (or guano or bones), 3/barley or oats with two bushels of annual rye-grass and eight pounds of red clover per acre, 4/cut grass or hay, while the latter was to have courses 5-10 in pasture in addition. On Meikle Bennan, let for 24 years from 1850, a six course rotation was to be used, the same as above but with two years pasture, but when the farm was re-let for 19 years in 1870 the rotation was to be five courses.

Similarly in Harelawholm and the Chapel Parks,[68] part of the farm was to remain in grass after one crop, while the remainder was to be under: 1/fallow, 2/clover, 3-4/corn. In the farm of Merkland[69] (19 years from M1803), the following rotation was to be observed: 1-2/ white crop, 3/green crop or summer fallow, 4/white crop with two bushels of rye-grass and eight pounds of red or white clover and four pounds of rib grass, 5-9/pasture. At the first break 80 bolls of shell-lime were to be put down, and at subsequent breaks 55 bolls were to be

used. When the farm was re-let in 1818,[70] the restrictions were similar, and at expiry there had to be one third of the land in four year old pasture, and one third in two year old. In 1861 the farm of Merkland was to be in six shifts, viz.:[71] 1/white crop, 2/drilled green crop or summer fallow plus bone dust or guano, 3/white crop with two bushels of rye-grass and four pounds red and four pounds white clover, 4/cut grass or pasture, 5-6/pasture. In South Whittyburn,[72] let for only one year from 1820, the cropping was clearly stated.

Brisbane tacks were less specific and dealt mainly with the state of the farm at expiry. At Netherhall, Largs (19 years from M1791), only a third of the outfield was to be ploughed, and two acres of infield left in grass at expiry; at Bankhead (19 years from M1806) and at Stakevelee (12 years from M1806), both Largs, one third of the land was to be left in four year old grass and one third in two year old.[73] Similarly in Laigh Farm, Kirkoswald (19 years from M1818), one third of the arable was to be in three year old grass at expiry.[74] Certain quantities of manure had to be laid down if two white crops were taken, and grass had to be sown with the last white crop. On the Stair estates in 1832 only general conditions were laid down;[75] one third of the holm land was to be yearly in sown hay and pasture, and one third of the tilled land had to be in summer fallow, turnips or potatoes. Two white crops could be taken only when the ground was first broken up, and grass had to be sown with the second crop (10 pounds red and white clover and two bushels of perennial rye-grass per acre). General conditions were also found on North Laigh Corton, Ayr (15 years from M1788),[76] no more than three crops were to be taken from lands which had not rested six years, and rye-grass and clover had to be sown with the third crop.

In Ayrshire then there is evidence of both detailed and general

cropping restrictions. In the latter case it is likely that these were made so as to afford farmers the opportunity to practise the farming methods which they felt to be best, within the framework of maintaining the land in good heart. Where detailed cropping restrictions were made, these seem to have been carefully tailored to the requirements of individual farms, and indeed to the needs of different types of land in the farm. It is unlikely therefore that they bound tenants to an unsuitable system of land use. Whether or not detailed restrictions were given appears to have depended on the preference of individual landowners.

Buteshire

Lease evidence for this county is almost totally lacking because the papers belonging to the Earl of Bute, the largest landowner, are still in private hands. It is not certain whether or not tacks exist among the family papers as there is not yet a detailed inventory of them. No relevant information was found among the papers of Fullarton of Kilmichael and Stewart of Ascog which are to be found in the Scottish Record Office.

Dunbartonshire

In Dunbartonshire leases, cropping clauses were included on most estates due to improving zeal among proprietors.[77] These were sometimes completely unsuited to local conditions; for instance, some tenants were bound to keep to the unenlightened system of three white crops followed by six years pasture.[78] In Cardross, however, the most improved rotations were specified as part of a scheme to improve the estate.[79] At least a third of the arable was to remain in pasture. but the tenants were given a choice of rotations which they might use.[80] These were: A, 1/fallow from old lea or stubble with lime or dung,

2/oats or bere with grass, 3/hay, 4/pasture; or B, 1/oats from lea or grass, 2/fallow or turnips with lime or dung, 3/oats or bere with grass, 4/oats or bere with grass seed. When manure was laid down, 20 carts of dung or 24 bolls of lime shells per acre were to be used. When land was sown to grass, 15 pounds of clover and two bushels of rye-grass were the quantities stipulated. In a 19 year lease of Hilton of Cardross from 1846,[81] the clauses were slightly less detailed. No two white crops were to be taken in succession, and no flax was to be sown without written consent. At least eight Scots acres (10 imperial acres) were to be under potatoes, turnips or summer fallow, and 25 chalders of lime per annum were to be laid down, of which the proprietor would provide 20 chalders in each of the first two years. Similar restrictions were included in the 19 year lease of Lochend from 1847.[82]

Lord Elphinstone at Cumbernauld, Lord Stonefield and Charles Edmonstone merely forbade the taking of two white crops,[83] and in surviving Cumbernauld tacks the only stipulation was that tenants were to use a certain amount of lime, part of which was given by the proprietor. For instance, on the farm of Whitelees[84] (19 years from M1794), nine heaps of lime were to be used, three of which were free; in Wester Forest[85] (19 years from M1795), six heaps were to be used, two of which were free; while in Middle Forest[86] (13 years from M1809), the tenant was to purchase £20 worth of lime per annum, but the proprietor would give £10 worth in each of the first two years. Similarly, in Leith-Buchanan leases the proprietor was to provide set quantities of lime or dung. In the farm of Drunglass and Bedmuck[87] (22 years from M1803), proprietor and tenant were each to pay for 24 chalders of lime per annum. In Blarannack[88] (19 years from M1804) the tenant was to lay down 20 chalders of lime annually, and the proprietor undertook to provide an extra 10 chalders in each of the first five years. Similarly

on Gartachan[89] (19 years from M1806) the tenant had to use 10 chalders of lime yearly, to be paid by the proprietor in the first three years; half of the farm could be ploughed yearly. On the farm of Batturich[90] the proprietor was to provide 30 carts of dung as well as £30 worth of lime (21 years from M1813). In a 19 year lease from 1814 and another from 1817[91] the first cropping restrictions appear: no more than two white crops were to be taken in succession, and at least two thirds of the farm was to be left in two year old grass at expiry. In the lease of Tullochan Mill[92] (22 years from M1822) this proportion had been reduced to a third, while in a 19 year lease of Easter Portnellan,[93] a third of the arable was to be in pasture during the last three years, well sown down with clover and rye-grass. In the lease of Blairlemans[94] (19 years from M1839), never more than half the land was to be under grain, and at expiry three fifths was to be in grass, ie. a fifth in two year old grass, a fifth in one year old, and a fifth in newly sown grass. The last crop was to be sown down with eight pounds red and white clover and half a boll of perennial rye-grass per acre. Similar conditions operated on the farm of Wester Tounhead of Alser, let for 19 years from 1840.[95] On the Duke of Argyll's farms in Roseneath the tenants had to enclose four acres round the house for clover and rye-grass for winter food for cattle.[96] On 18 year leases from 1805[97] the tenants were bound to make six divisions and to crop them thus: 1/oats with four chalders slaked lime per Scots acre, 2/potatoes or green crop, 3/barley or white crop with eight pounds red clover and two bushels rye-grass per Scots acre, 4/hay, 5-6/pasture.

In Dunbartonshire, proprietors were aware of the value of sown grasses and of manures, and encouraged their use. In the case of manures, many proprietors were willing to provide at lease some of the material to be laid down. They seem to have been less convinced of the

usefulness of detailed cropping clauses, and concerned themselves chiefly with ensuring that the farm was in good condition at expiry. The one example of detailed restrictions which the tenant had no choice but to obey comes from the Duke of Argyll's lands in the upland parish of Roseneath. Perhaps he was using conditions similar to those used in his Argyllshire leases, or perhaps additional guidance was felt to be necessary in an upland area. We do not have any clear ruling as to why detailed covenants were felt to have been unnecessary in much of Dunbartonshire, but it may well have been that farmers were knowledgeable enough to manage without such guidance.

Lanarkshire

In Lanarkshire all surviving leases have some regulations to prevent damage to the farm towards the end of the lease, and in addition some state the proportion which could be in tillage, while others lay down specific rotations.[98] In Carmichael some tenants were bound to a six course rotation,[99] and in a general lease of Carnwath estate for 1854,[100] one sixth was to be in fallow, potatoes or turnips, well cleaned and manured and sown with 12 pounds white and red clover and two bushels perennial rye-grass per acre, three sixths in sown grass or hay and two sixths in corn. For Lockhart's lands in Glasgow Barony, Govan and Carmunnock many leases have survived.[101] The restrictions in them are fairly loose, but some apply to the whole lease, while others relate only to the last few years. The lands of Over Possle[102] (19 years from M1779) were not to be worked for more than two years without dung, and had to lie in grass for as long as they had been worked. For other lands in Carmunnock and for Pedmyrebank[103] (20 years and 19 years from M1791) the farms could be ploughed for two years and left four years in grass, or ploughed for

three years and left for six. Meadow Park[104] could be managed on any good system until the end of the lease, when one third of the land was to be in four year old grass. In Netherton,[105] never more than one third of the farm was to be in crop, and at expiry one quarter was to be in four year old lea, one quarter in two year old, and a quarter sown down with grass seed. In all these leases a set quantity of Glasgow dung had to be laid upon the farm. Again, in leases of Loanhead and Roadhead in Libberton[106] (19 years from M1850), the stipulations related chiefly to the last few years: no more than two white crops were to be taken, and in the last five years the farm was to be in: 1/turnips, potatoes or fallow, well cleaned, dressed and manured, 2/grain sown down with grass, 3/hay, 4/pasture, 5/grain. On Gallowhill,[107] Carmunnock (19 years from M1830) there were to be no more than two white crops in the last four years, in the last three years one sixth of the arable was to be in summer fallow or green crop, well manured, and in the last two years a white crop was to be sown down with eight pounds of red and white clover and two bushels of rye-grass per acre on the previous year's green crop. Similar conditions were used on the farm of Muirside,[108] let for 19 years from M1852.

Similarly in Holm,[109] Douglas (19 years from M1799), no more than three successive white crops were to be taken (unless one was peas), and in the last six years at least one sixth of the infield and one third of the outfield was to be in lea grass, and in the last three years one third and two thirds were to be thus. On the farm of Jackton,[110] Kilbride (18 years from M1878) the restrictions applied for the whole term, no more than one third of the arable was to be in tillage, and the land had to be well dunged and limed before breaking up. Three white crops could only be taken if the land had been rested for six years in grass. In Wester Nerstoun,[111] East Kilbride (19 years

from M1852), one sixth of the land was to be yearly in grass and one sixth in summer fallow, beans or green crop, drilled and horse-hoed and well manured. No two white crops could be taken, and grain was to be sown down with six pounds of red and three pounds of white clover and 12 pecks of rye-grass per Scots acre. In the lease of Spittal and Caldlaw, Carnwath, and that of Westside, Lanark,[112] it was stipulated that the arable was to be in six breaks. No two white crops were to be taken in succession, and corn was to be sown down with 12 pounds of white and red clover and two bushels of perennial rye-grass per acre. Three sixths was to be in sown grass or hay, two sixths in corn, and one sixth in green crop.

In Lanarkshire cropping restrictions, particularly towards the end of the lease, were common. Landowners were keen to protect their property and to encourage wise husbandry, while allowing farmers some personal choice in the crops which were grown. A willingness to adapt to local circumstances is shown in the mention of Glasgow dung, a rich fertilizer, available only to those living close to the city.

Renfrewshire

In Renfrewshire very few leases included detailed management clauses, but generally tenants were bound to observe the 'rules of good husbandry', and to keep two thirds of the farm in grass.[113] Sometimes they were enjoined to lay down a set quantity of manure, and as in Dunbartonshire the proprietor would sometimes provide this free.[114] For instance, in Greenyards the tenant was to provide six heaps of limestone and the proprietor three,[115] while in Carrickstone they were to provide six each[116] (10 years from 1803 and 19 years from 1799 respectively). In Eastwood detailed cropping clauses were thought superfluous if the tenant had been carefully selected.[117] The Parks

of Levenside (let for 12 years from 1810), could be broken up in part but were to be left in two year old grass at expiry.[118] South and North Bardrainy[119] (57 years from M1794) was to be manured regularly, and one third of the arable was to be in four year old grass at expiry. Knockbuckle[120] (38 years from M1800) was to be at expiry one quarter in pasture of four years old, one quarter in pasture of three years old, one quarter in two years old pasture, and one quarter sown down with two bushels of rye-grass and six pounds of red clover per acre. Knockmountain and Bogside,[121] both let for 19 years from M1825, were to be managed according to the rules of good husbandry, and no more than two white crops were to be taken. When the Lordship of Paisley was let in 1807[122] fairly loose stipulations were included: a quarter of the farm could be in wheat, a quarter in another white crop, a quarter had to be in green crop or fallow with 30 carts of dung per acre, and a quarter in sown grass. The granting of a new lease before the old one had expired prevented the land from being outrun.[123]

Detailed cropping clauses seem to have been rare, and this may have been due to individual choice, local fashion or experience.

Stirlingshire

In Stirlingshire in 1796 leases including management restrictions were fairly recent,[124] and even by 1812 some leases had no such clauses.[125] As in Dunbartonshire, some leases bound tenants to crop for three years and to pasture for six, so that the land became exhausted.[126] In a bundle of tacks of Erskine of Cardross's lands in Perthshire[127] (Port of Menteith) and Stirlingshire (Kippen) from 1849-74 a detailed system was usually stipulated. On carse lands the following rotation was to be used: 1/summer fallow, potatoes or turnips well worked, drilled, horse- or hand-hoed and manured, 2/wheat or oats, 3/beans, 4/barley

with clover and perennial rye-grass, 5/hay or pasture, 6/pasture or oats; while on the dryfield a different system was laid down (or a simpler version of it), viz.: 1/summer fallow, potatoes, turnips or mangel wurzels, cleaned and horse- or hand-hoed, summer fallow to be manured with 16 tons of cow and horse dung per acre, potatoes or mangel wurzels with 30 tons of cow and horse dung and four hundredweights Peruvian guano per acre, and turnips with 24 tons of cow and horse dung and four hundredweights Peruvian guano per acre, 2/wheat, barley or oats plus one bushel of perennial rye-grass plus 10 pounds white, red and yellow clover per acre, 3/hay or pasture, 4/pasture, 5/pasture, 6/oats. If more than one half division was sown with potatoes, 15 tons of dung per acre was to be laid down. A stipulated quantity of lime had to be used as well as the manure mentioned above.

In Falkirk the rotation was similar to that used on the Carse lands,[128] ie.: 1/fallow, 2/wheat, 3/beans, 4/barley, 5/clover and rye-grass, 6/oats; while on the green crop land of Campsie the rotation was as follows: 1/oats, 2/potatoes or turnips, 3/barley, wheat or oats, 4/hay, 5-6/pasture.[129] In the lease of Auchintyre, Airth[130] (14 years from M1829) the tenant was bound to seven shifts, but in many leases the proprietors were less specific. One the estate of Ochtertyre in Kincardineshire 19 year leases were given in 1797 on condition that the general regulations were followed.[131] No wheat was to be sown without a preceding summer fallow on which had been laid four chalders of lime per acre, and a succeeding green crop. Bere or barley could only follow potatoes or a green crop, and no two successive oat crops were to be taken from the infield and no more than two from the outfield. On the farm of Finart in Drymen[132] (18 years from M1804), the tenant was not to work more than one third of the arable, a white crop had to be taken when the land was broken from

lea, a green crop could follow, then another white crop, then hay and three years pasture. In three Gartmore leases[133] tenants were forbidden to take two white crops and were to lay down lime. The conditions were a little more specific in the lease of Glentirran[134] (23 years from M1794): one quarter of the arable was to be in wheat, one quarter in barley, one quarter in oats or beans and one quarter in grass, fallow, turnips or potatoes. The ground was to be dunged (30 carts per acre) and limed (3 chalders per acre). When laid to grass, two bushels of rye-grass and seven pounds of red and three pounds of white clover were to be used, and the land was to remain in pasture for two years. In Leith-Buchanan leases, the proprietor was concerned about the state of the lands at expiry, but in contrast to his Dunbartonshire leases there is little mention of the use of lime, presumably because the land did not require it. On the farm of Ballenton[135] (19 years from M1796) two thirds of the land was to remain in grass for the last three years. In Wester Cameron[136] (17 years from M1812) one half of the arable was to be left in two year old ley, in Ballenton[137] (19 years from M1837) one third of the arable was to be in pasture at expiry, while in Claggans[138] two thirds of it were to be thus (19 years from M1840). When Wester Cameron was re-let in 1843 for 19 years, three fifths of the arable was to be in grass at expiry.[139]

In Stirlingshire as elsewhere, tenants were enjoined to use beneficial cropping and manuring practice. A particular system of land-use had developed on the carse lands, and farming practice was adapted to suit various local conditions. In some cases the use of modern methods, including the application of Peruvian guano, was stipulated. Lease covenants then were used as a way of ensuring that farmers practised a modern type of husbandry and one which was suited to the land which they cultivated.

MANAGEMENT CLAUSES - SUMMARY

It can be seen that management clauses in leases were many and varied, and it is difficult to bring out any meaningful trends. There was a similarity between the leases of each estate, but different stipulations were sometimes included to suit particular conditions. Differences existed within and between estates and counties. For instance, in Renfrewshire it is unusual to find a lease which incorporates detailed restrictions of cropping, while in many Carse and Dryfield areas of Stirlingshire it was usual to give a specific rotation for a farm or even for part of a farm. This varied not only between counties. Campbell of Jura did not make detailed specifications, but Lord Breadalbane laid down more restrictions and Campbell of Barcaldine stipulated specific rotations for some of his farms. In Stirlingshire cropping clauses were constructed to suit the different soil types found on Carse and Dryfield, and in Lockhart's lands near Glasgow, dung from that city was specifically mentioned in leases. In Argyllshire, crofts were treated differently from full-sized farms, and lease stipulations were made to encourage the use of modern practice. It is clear that even by the late nineteenth century there was no universally-adopted system of farm management.

It would be convenient if it could be shown that the inclusion of too many or too few management clauses had fallen into disuse as a result of the writings of Sinclair and others and in the light of experience. This is not the case, for some of the later leases included stipulations just as detailed as the earlier ones. The fact that Renfrewshire leases included so few specific clauses suggested a link with proximity to urban and industrial areas, where farming would have needed to have been highly flexible. This is not borne out,

however, by a consideration of similar areas in Lanarkshire and Dunbartonshire. The important influence which towns had on some rural areas is evident from the mention of Glasgow dung in several Lanarkshire leases. The fact that some proprietors were not confined to traditional lease stipulations is shown in the mention of Peruvian guano, a manure which in the 1840s was of fairly recent popularity.

Lease covenants must, therefore, be seen as the product of traditional ideas as well as new fashions, of local circumstances and of individual taste, and they were made to suit specialised conditions. Provided a lease suited the case in hand there could be no right or wrong way of granting it. Leases varied from area to area and time to time, but it is possible to extract generalised conditions and to construct a model lease.

LENGTH OF LEASE

"The duration of leases is considered by many people as the mark by which to judge of improvements in agriculture in any district."[140] Indeed the length of a lease had an important bearing on how a farm was managed, and varied greatly according to circumstances and fashion.[141] A lease had to be long enough to enable the tenant to obtain a fair return from the land, but short enough to avoid complacency. If a lease was too short, the tenant would have been unwilling to lay out money on the farm, while if it was too long, the landlord would have had no safeguard against inflation. The granting of a suitably long lease was a complex process. In Scotland the commonest length of lease was 19 years, whereas in England much of the land was let from year to year,[142] because landlords there were more concerned to ensure tenants' votes.[143]

It is convenient to divide leases into long, medium, and short, for the purpose of discussion, but it is difficult to select boundaries for each category. Although leases were granted for any number of years from one to 57 (see Table 3:2), it seems possible to make a break at 25-26 years between long and medium leases, and at 10-11 years between medium and short ones. This division is necessarily arbitrary, but since it facilitates a consideration of the evidence, while not disguising any trends in the data, it has been used.

Long Leases (26-57 years)

In the mid-eighteenth century it was common to grant leases of up to 57 years. At that time it was difficult to let land, and long leases were offered as an inducement for tenants to take farms.[144] In Stirlingshire in the 1740s, leases of 38 and 57 years, or of three and four lives, were granted for this reason,[145] and in Ayrshire those of three or four times 19 years had been given.[146] Even in 1812 some 57 year leases on the Killearn estates still had 20 years to run.[147] Three long tacks survive for the Castlemilk estates; one of 56 years from 1770 for a farm in Innerkip parish,[148] one for 57 years from 1785 for lands in Carmunnock,[149] and another for 31 years from 1792 also for Carmunnock.[150] A 57 year lease was given in Kilmacolm in 1794,[151] a 38 year one in Largs in 1786,[152] and a 34 year one in Colmonell in 1782.[153] Since none of these leases bound the tenant to make improvements, it is probable that they were granted as an inducement to take land.

Another reason for granting a long lease to an able tenant was to improve the land. If the farm was in a poor state a long lease was necessary, so that when the improvements were finished the tenant could hope for several years of good returns. If the proprietor wished

Table 3:2

LENGTH OF LEASE

Length of leases granted per decade, showing number of leases and percentages of total in decade for each length

DATE OF GRANTING

YEARS	1770-1779	1780-1789	1790-1799	1800-1809	1810-1819	1820-1829	1830-1839	1840-1849	1850-1859	1860-1869	1870-1879
1			1 (1.3%)		1 (3.1%)	4 (7.3%)		4 (2.3%)	6 (8.2%)		17 (50.0%)
3			1 (1.3%)	1 (2.8%)							
4					1 (3.1%)		1 (1.4%)				
5			2 (2.7%)	2 (5.5%)		1 (1.8%)		1 (0.6%)		3 (4.1%)	
6				1 (2.8%)							
7			2 (2.7%)	1 (2.8%)			6 (8.7%)	1 (0.6%)	2 (2.6%)	1 (1.0%)	
8						1 (1.8%)	1 (1.4%)			1 (1.0%)	
9			2 (2.7%)	1 (2.8%)		2 (3.6%)		27 (16.1%)			
10			1 (1.3%)	3 (8.3%)					3 (4.0%)	1 (1.0%)	
11		1 (2.9%)	5 (6.7%)	1 (2.8%)				1 (0.6%)		1 (1.0%)	
12-13			3 (3.9%)	5 (13.9%)	3 (9.3%)	5 (9.0%)		2 (1.2%)			
14			1 (1.3%)	1 (2.8%)	1 (3.1%)	3 (5.4%)		3 (1.7%)		2 (2.0%)	
15		2 (5.8%)	3 (3.9%)	1 (2.8%)	8 (25.0%)			1 (0.6%)			1 (3.0%)
16		1 (2.9%)	1 (1.3%)	1 (2.8%)		2 (3.6%)	1 (1.4%)				
17				1 (2.8%)	2 (6.2%)		2 (2.8%)	2 (1.2%)	1 (1.3%)	1 (1.0%)	
18		2 (5.8%)	5 (6.7%)	1 (2.8%)	1 (3.1%)	5 (9.0%)		2 (1.2%)	2 (2.6%)	1 (1.0%)	
19	3 (60%)	23 (67.6%)	41 (53.9%)	12 (33.3%)	14 (43.7%)	26 (47.2%)	50 (72.4%)	119 (71.2%)	58 (79.4%)	83 (83.3%)	16 (47.0%)
20	1 (20%)	1 (2.9%)	2 (2.7%)			1 (1.8%)	3 (4.3%)			5 (5.1%)	
21			1 (1.3%)	1 (2.8%)	1 (3.1%)	1 (1.8%)	5 (7.2%)	2 (1.2%)			
22-23			1 (1.3%)	1 (2.8%)		1 (1.8%)					
24				1 (2.8%)		1 (1.8%)		1 (0.6%)	1 (1.3%)		
27		1 (2.9%)									
31			3 (3.9%)			2 (3.6%)		1 (0.6%)			
34		1 (2.9%)									
38		1 (2.9%)		1 (2.8%)							
56-57	1 (20%)	1 (2.9%)	1 (1.3%)								

the farm to be improved quickly, he could grant a shorter lease at a low rent, but many proprietors were unwilling to do this. Aiton recommended 25-35 year improving leases on virgin land.[154] Forbes of Callender made improvements to his estate then let the farms on long leases.[155] In Lanark c.1780-90 small plots of land were let to burgh people for 57 years in the hope of fostering improvement. Unfortunately the lands were two miles out of town, so the scheme was unsuccessful.[156] In the 1770s in Lanark, farms were let on 38 year leases if tenants agreed to enclose them.[157] Moss-tenants of Gartmore (Perthshire) were given 38 year improving leases,[158] while a 31 year lease was granted in 1797 as an encouragement to further improvements, and in token of those already made.[159] For Cardross (Perthshire) a moss-tack of 32 years has survived,[160] so clearly a similar system of granting improving leases operated on that estate.

In other examples the motive for granting a long lease is less clear. In Ochiltree in 1840 lifetime tacks were expiring,[161] while in Blantyre long leases were still running.[162] In Carstairs a Mr. Fullarton let land for 57 years at a reasonable rent,[163] and in Kilbarchan 57 year leases had been given in "olden times".[164] In Dunbartonshire some of Lord Stonefield's lands were let on the tenant's life,[165] while in Lanarkshire in the 1790s leases of 31 years or more were sometimes given to tenants who made extraordinary improvements.[166]

Most examples of long leases come from the mid-eighteenth century and apply to lowland areas. The early and mid-eighteenth century was a period of great agricultural improvement,[167] and it is likely that many landowners in the advanced lowland areas wished to foster these improvements on their own estates. Also, these were the areas in which arable farming was most important, long term investment being more vital in arable than in pastoral agriculture. One of the easiest ways

of encouraging improvement was to grant long leases. If land was difficult to let, improving landlords would have been willing to offer a long lease in order to attract a good tenant. In the upland areas, especially Argyllshire, the progress of improvements was slower, the pressure of population on the land greater, and the role of pastoral farming more important, therefore the granting of long leases did not penetrate the area. Even in the lowlands the practice did not continue long, because proprietors discovered that leases of 30-60 years encouraged some tenants to become lazy and complacent. Also, rising rents after 1780 emphasised that leases should be short enough to permit price trends to be followed.[168] Basically, proprietors began to see long leases as too lengthy a commitment. Long leases had never been widespread, but by the early nineteenth century they had gone out of fashion,[169] and existed only as a survival from the past (see maps 3:2 and 3:3).

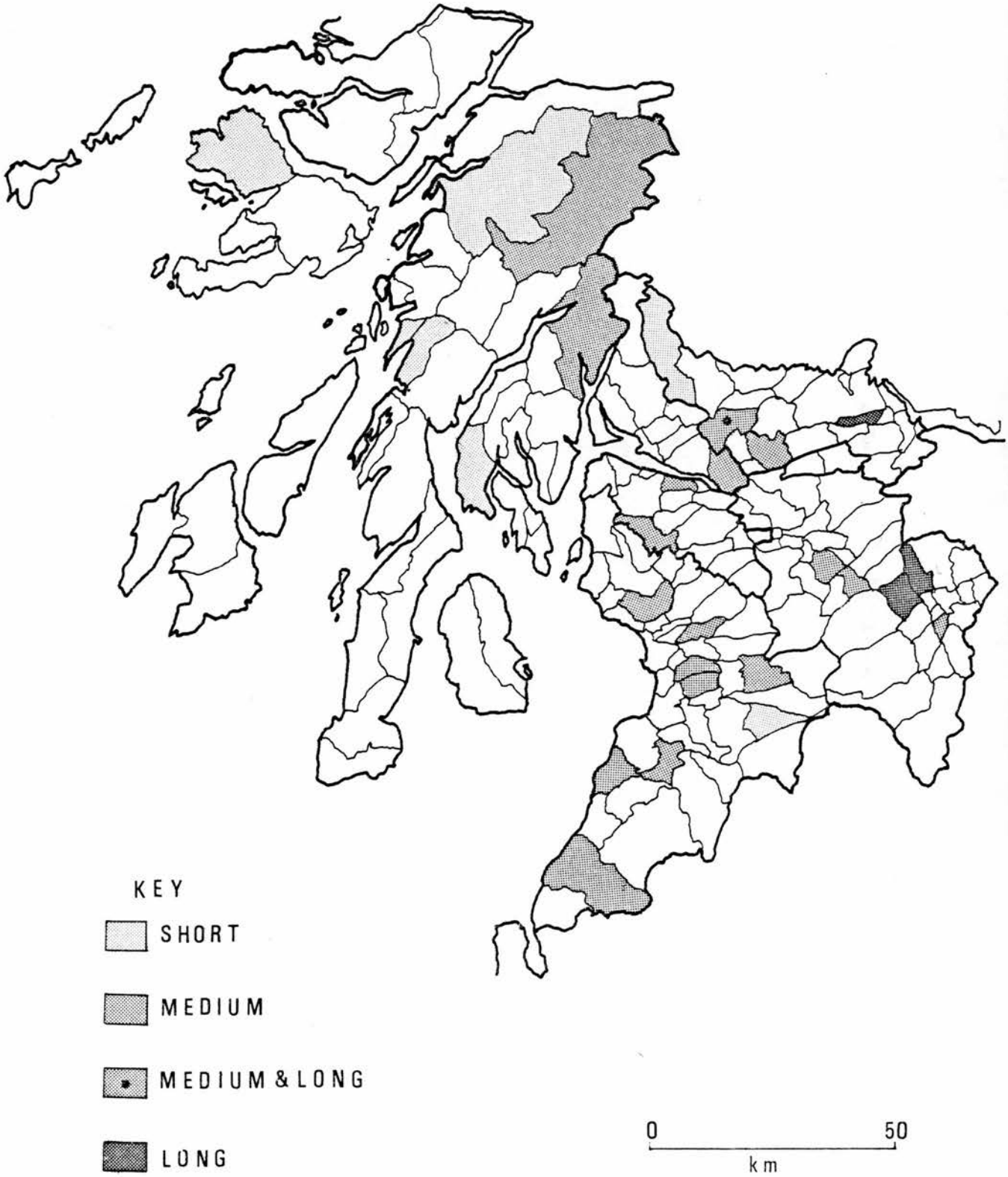
Medium Length Leases (10-26 years)

It has already been stated that 19 year leases were the most common throughout the period, and this was probably a suitable length for most purposes, although in the Old Statistical Account of Kilmarnock this was felt to be too short to allow the use of a proper rotation, and leases of one or two lives were recommended.[170] Sinclair considered 19 years to be a good length,[171] and Kames recommended one or two times 19 years.[172] The figure 19 had been chosen in earlier times because it was the length of the Metonic Cycle, a period which covered all the changes of the moon. It was traditionally believed that this cycle influenced the character of the seasons, and that within it all types of conditions, both good and bad, would be experienced. Long leases were often given in multiples of 19. In the second series

of Agricultural Reports, 19 year leases were stated to be the most common in each of the seven counties. This is emphasised by the Old and New Statistical Accounts, for in those parishes where length of lease was mentioned, 19 years was by far the commonest term.[173] On the Earl of Bute's lands almost all leases were for 19 years and this was found to be a beneficial system.[174] Again, in the 680 examples from private estate muniments, 19 year leases were most frequently met with. The percentage of 19 year leases among surviving tacks varied considerably (60 per cent, 1770-79; 67.6 per cent, 1780-89; 53.9 per cent, 1790-99; 33.3 per cent, 1800-09; 43.7 per cent, 1810-19; 47.2 per cent, 1820-29; 72.4 per cent, 1830-39; 71.2 per cent, 1840-49; 74.4 per cent, 1850-59; 83.3 per cent 1860-69 and 47.0 per cent, 1870-79) (see Table 3:2 and Graph 3:3). Those decades for which the sample was largest have some of the highest percentages of 19 year tacks. Sturrock stated that most Ayrshire leases in the 1860s were for 18 or 19 years.[175] The low percentages of 19 year leases during the war years, particularly the decade 1800-09, are accompanied by high percentages of leases of less than 19 years. Although the samples are relatively small, this suggests that, with the rapid inflation which occurred during these years, proprietors may have been reluctant to grant leases for periods as long as 19 years due to the impossibility of adjusting the rents to keep pace with inflation once a lease had been granted. Also, competition for farms was probably so intense that farmers were willing to accept shorter leases in order to take advantage of the high prices for agricultural products. The low percentages during the next two decades may partly represent a time lag in the effects of short leases granted during the war, and partly the fact that prices were still fluctuating violently and conditions remained uncertain. The high percentages of 19 year leases

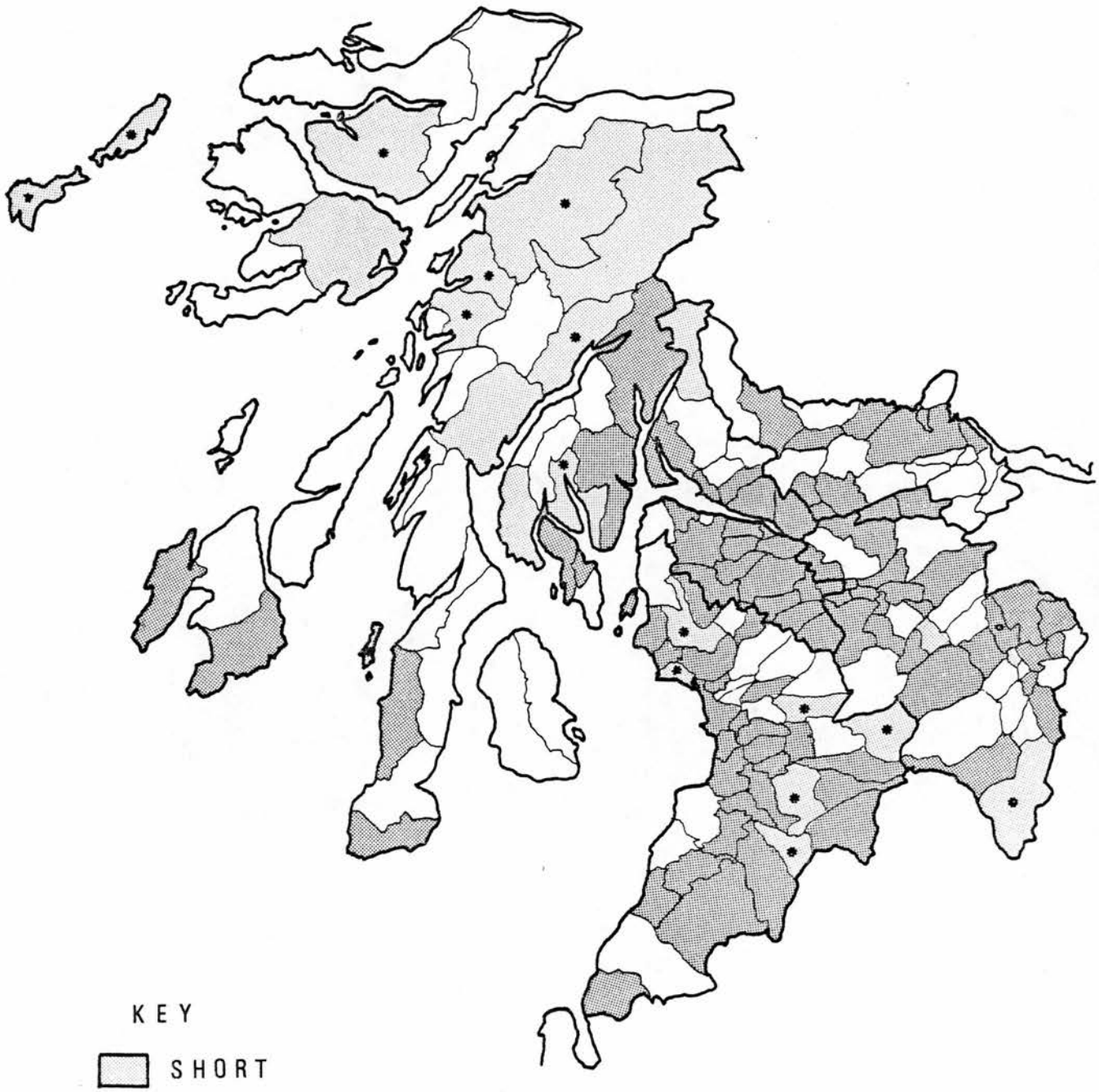
MAP 3:2

LENGTH OF LEASE - SOURCE O.S.A.



MAP 3:3

LENGTH OF LEASE · SOURCE N.S.A.



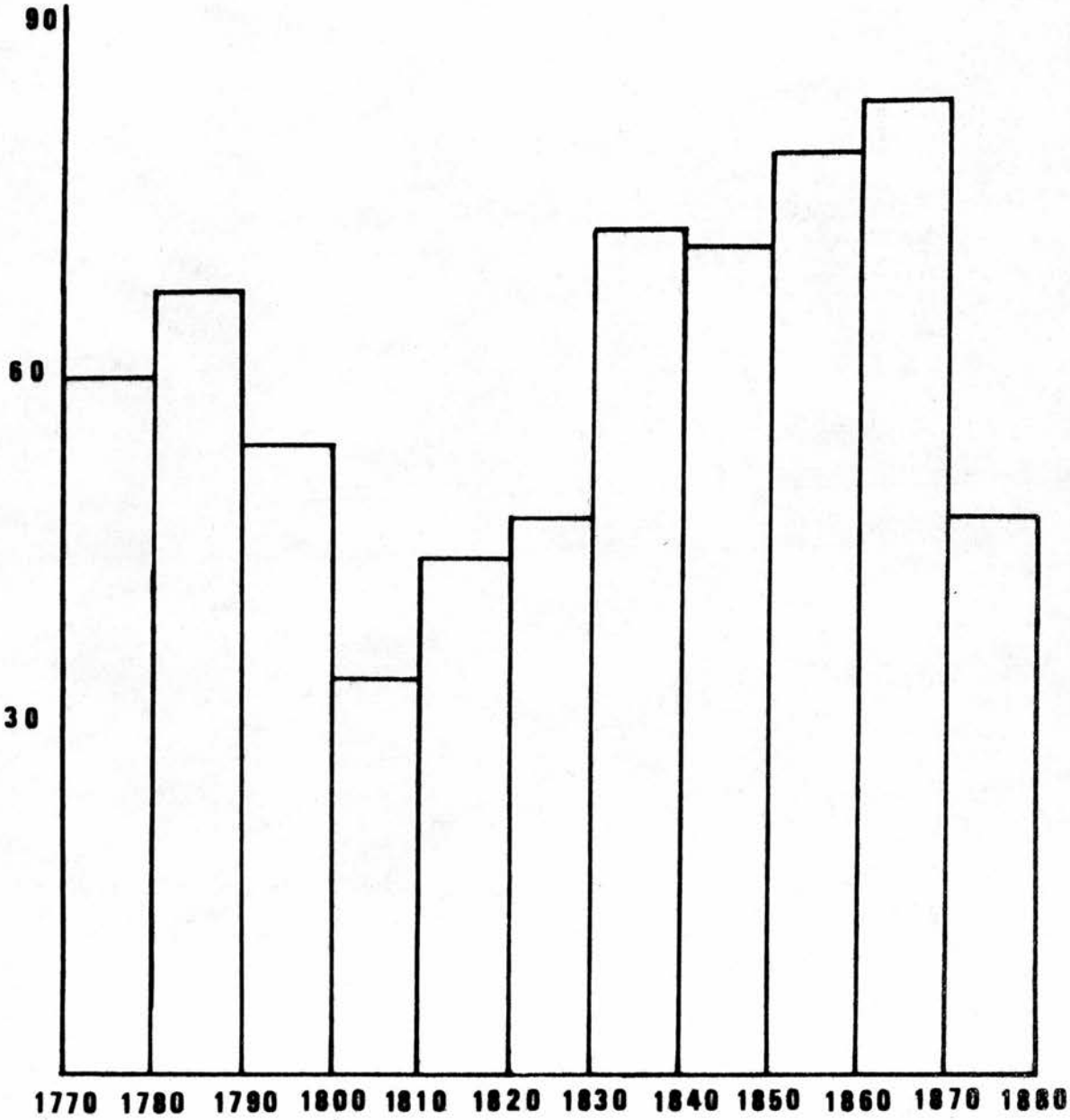
from 1830 to 1860 corresponded with a return to more stable prices and with a wider use of more modern farming practices; the fair deal ensured to both proprietor and tenant by a medium length lease must have seemed more attractive. The increase in short leases from 1870 probably reflects a swing towards short-term pasturing, for this had become more profitable than arable farming.

Although 19 years was the commonest term, leases of 17 or 18, 20 or 21 years were frequently granted. These are only a slight variation on 19 years, and were probably given for the same reasons as 19 year leases (ie. sufficient time to get a reasonable return from a farm); 20 is a round number and 21 has long had special significance, while 18 was suitable for the operation of a six or nine course rotation. Leases of 14, 15 and 16 years were also frequently granted, probably by proprietors who wished to give a lease of reasonable duration while minimising the time during which the rent remained steady. Also, the uncertain times after the Napoleonic Wars must have made proprietor and tenant wary of entering into too lengthy a commitment, and the tenant might have been able to negotiate a slightly lower rent for a 15 than for a 19 year lease.[176]

In Erskine c1835 recent leases had been granted for 15 years,[177] while in Cumbernauld, 13 or 15 year leases were becoming common.[178] Even shorter leases were sometimes given for this reason. In Renfrewshire c1810, proprietors had begun to reduce the term to 10 or 12 years especially on renewed leases,[179] and in Stirlingshire at a similar date, proprietors were likewise tempted to give shorter leases in order to obtain frequent rent rises;[180] this was probably a reflection of inflation. Even in the favoured carses some 10 year leases were granted.[181] In East Kilbride several farms on the Torrance estate had been let for 12 years from c1835,[182] and in Stonehouse, 12 year leases at very high

DIAGRAM 3:3

NINETEEN YEAR LEASES AS PERCENTAGE
OF TACKS GRANTED



rents were given for lands near the village.[183] In many parishes of the New Statistical Account, 19 years was the longest term quoted eg. Ardrossan 12-19 years, New Cumnock 15-19 years, Old Cumnock 14-19 years, Ochiltree 9-19 years, Stevenston 12-19 years.[184] Robertson remarked on the tendency to shorten leases from 19 years.[185] It is likely that these shorter leases were granted for the reasons already outlined.

In Ayrshire the improvements of 1760-70 caused proprietors to vary the 18 or 19 year leases which had been common.[186] They were replaced by 18 or 27 year, or 12 or 24 year, tacks based on a nine or 12 year rotation, so that the tenant was able to complete a set number of rotations. Two 24 year leases have survived for Colmonell, granted in 1849 and 1850,[187] and another dates from 1805.[188] A 27 year lease was given in Stewarton in 1783,[189] and may be seen to fit into the trend towards long leases, as well as being three times a nine year rotation.

Argyllshire presents rather a different case. There short leases had been common, partly due to unimproved agriculture, and partly because there were many grazing farms for which short leases were preferred. In the Old and New Statistical Accounts, short leases were blamed for the unimproved state of agriculture,[190] and by that time there was a move to grant longer leases, for instance in Dunoon improving leases of 19 years were granted,[191] while in Killean tenants were bound to use improved rotations on 19 year leases.[192] Leases of 11 to 18 years did occur in Argyllshire,[193] but it is likely that these were part of the movement to lengthen the term, rather than evidence of a shortening of leases, for short leases had already proved undesirable.

Middle-length leases were the commonest type throughout the period, because they provided the best compromise between the interests

of landlord and tenant. Most leases were of the traditional 19 years, but individual taste and local circumstance meant that other lengths were not uncommon (see maps 3:2 and 3:3).

Short Leases (1-10 years)

Short leases were granted in small numbers throughout the period (see Table 3:2), despite the fact that they were frequently blamed for any lack of agricultural improvement.[194] The criticisms applied chiefly to arable farms, for on a grazing farm less capital was required and a short lease need not have been a handicap.[195] However, Sinclair did recommend a longer lease so as to prevent frequent changes of tenant, but grazing farms were often let for short periods. Short leases might also have been given by proprietors wanting frequent changes in rent. On some already improved farms, this must have been more important than ensuring that the tenant would make improvements, and in times of high prices tenants might have been so eager to obtain a farm that a short lease would not have been too great a disincentive.

Sinclair recommended 9-13 year leases for sheep farms,[196] and indeed sheep walks in Stirlingshire were let for nine years.[197] In Dunbartonshire there were some 4 or 5 year and some yearly tacks,[198] and in Arrochar, a chiefly pastoral parish, the leases were generally for 9 years.[199] In Lanarkshire too, short leases were given on grazing farms,[200] and in the parish of Crawford, a pastoral area, 9-15 years was the commonest term.[201] In Argyllshire, where there were numerous grazing farms, there were many short leases, while some tenants had no leases at all.[202] In Ardchattan 7-9 years was the normal length of leases, and in Glenorchy, Kilfinan and Torosay they were seldom granted for more than 9 years.[203] In Inverchaolain sheep farms were let for 9 years at high rents, and in Gigha and Cara there

were some 7 year tacks, while in Kilmore and Kilbride, and Kilninver and Kilmelfort, the term ran from 7 to 19 years.[204] In Glassary, Inveraray, and Kilbrandon and Kilchattan, some lands were held from year to year.[205] In Craignish farms were held on short or no leases, and in Kilninian there were some very short tacks.[206] Leases of 9 years have survived from Nether Lorn (1820),[207] Barcaldine (1796 and 1800),[208] and of 7 years from Jura (1856),[209] Kilmore and Kilbride (1865)[210] and Barcaldine (1796).[211]

Ayrshire was an important dairying area and short leases had become common there from c1830.[212] As in the case of the grazing areas, short leases would have been less detrimental to a dairy than to a corn farm. In Auchinleck, where dairying was important, leases were commonly for 9 years, in Ochiltree for 9-19 years, and in upland Muirkirk for 7-15 years.[213] In Kilmaurs an 8 year lease of a grain farm was granted in 1824, and was renewed for a further 8 years in 1832.[214] The reasons for so short a lease being given are difficult to elucidate, as the rent was the same in both agreements. In Dalry most leases were for 10-15 years, and a few for 19 years, but a tendency to grant them for 2 or 3 years had begun by 1835, while on the Duke of Portland's estate in Galston, the "English system" of letting annually had been introduced.[215] Depreciation of the farm was prevented by remunerating tenants for permanent improvements which they made. In Mauchline and Stevenston some lands were let by the year.[216] The small number of short leases surviving means that any conclusions about trends must be extremely tentative; however, it is possible that the high percentage (50 per cent) of one-year tacks for the 1870s points to the uncertainty of the period, to the preference for grazing in the face of competition in other sectors (see Table 3:2) and also to the impact of foreign competition.

Other reasons were sometimes responsible for the granting of short leases. In Dalmellington, 7 year leases had been given as a preliminary to the granting of 19 year ones to tenants who proved themselves skilful.[217] In Carnwath a 7 year lease granted in 1851, and a 2 year one in 1856, were given because the Lockhart heir's tutors were empowered to grant leases lasting only until 1858.[218] They did,however recommend that the term be extended to 19 years. Crofts in the village of Wandell were let for 9 years, while for Largs a 7 year tack for one acre of land has survived from 1797.[219] These small plots were probably improved, then let on short leases to facilitate frequent rent rises.

In some of the upland areas, not all the farms were let on lease; small tenants in particular had no written tack. In Kilcalmonell and Kilberry, some estates were let without written leases, and in Luss and Craignish few of the tenants had them.[220] In such cases the tenants continued at the will of the proprietor. The system was blamed for a lack of agricultural improvement, while the possession of leases was acknowledged to encourage improvement. Tenants-at-will were almost exclusively confined to the Highlands and Islands, and the system was a relic of the old paternalistic society.[221] It was unsatisfactory to all parties,[222] yet it continued because of conservatism and tradition in remote or backward areas. It is interesting, however, that in the Hebrides by 1794, leases were generally given in writing.[223] Few examples of tenants-at-will come from the Lowlands, but one case from the Gartmore estates[224] illustrates some of the evils of this ancient system. Mrs. Janet Graham had a verbal agreement with David Erskine's factor to the effect that she might remain on a pendicle of Whitehill Moss until Martinmas 1868. However, in 1862 this agreement was revoked and Gilbert McCall was made tenant from

Martinmas 1862. Mrs. Graham had no redress.

Various considerations induced proprietors to grant short leases or to have tenants-at-will. The practice did not die out in the face of improvement, and may indeed have had some value on pastoral farms or in times of rapid change and uncertainty (see maps 3:2 and 3:3).

CONCLUSION

Leases form a large part of estate collections and provide much useful information on the management of farms. They are very important to Scottish agriculture as so many farmers were, and are, lease-holders. Leases were drawn up on behalf of the proprietor, but represented the interests of landlord and tenant, and were carefully constructed to suit individual farms and conditions. There was considerable variation in the stipulations of leases, and in the regulations laid down by them, so tenants would have had to be shrewd in their dealings with landlords. The lease formed the basis of farming, but detailed agricultural practice was dependent on other considerations too, and some of these may have encouraged the infringement or alteration of lease covenants. Some of the details of farming practice will be dealt with in later chapters.

CROP SECTION

INTRODUCTION

The raising of plants for food is fundamental to any farming operation whether arable or pastoral. Crops may be raised for direct consumption by man or used as an input in pastoral farming. In the former case they are an end product in themselves, while in the latter they are a raw material and may be eaten off the ground or used for stall feeding. The growing of animal fodder was particularly important before the widespread use of artificial feedstuffs. The management of cropping has a profound influence on the profits of the farmer, and on maintaining the land in good condition. This section will consider the crops which were raised in the study area, their advantages and disadvantages, and their importance to agriculture. It is necessary when considering crops to deal also with rotations and manures. The succession in which plants are grown affects the fertility of the soil and its ability to bear further crops, while manures also influence fertility by providing additional nutrients for plants and enabling higher yields to be produced.

A wide variety of crops was raised in the study area. Some of them were traditional ones which had been grown for centuries,[1] although new varieties had sometimes been introduced, while others had been grown for a comparatively short period.[2] Farmers tried to discover new and better varieties, and new rotations which would maximise returns from the soil, while maintaining it in good condition for future crops. There is comparatively little information on farming practice after about 1840, but it is fortunate that the early nineteenth

century is well covered, for it was in this period that most experiments with cropping were carried out, and that methods became established. It is unfortunate, however, that numerical data are available only from the 1850s.

The chief crops will now be considered in turn, and their modes of management and cultivation will be discussed.

Chapter 4

GRAIN CROPS

1. WHEAT

Of all the grains, wheat was the most profitable,[3] and its price was consistently much higher than that of other crops. Much of Western Scotland is, however, marginal for wheat cultivation; it was a difficult crop to grow and its yields were unreliable.[4] It could be grown successfully on suitable soils and in favourable weather conditions, but many farms on less suitable land grew it because of its potentially high rewards, although they seldom did so on a large scale, as other crops were more reliable. Most of the wheat grown in Scotland was of the winter type, ie. sown in autumn, but some winter wheat was sown in spring,[5] and in 1813 true spring or summer wheat had been recently introduced.[6] In the less favourable districts, autumn sowing was recommended.[7] The red or white varieties of wheat were the most usual ones. The red wheats were falling into disfavour by about 1814, because the white wheat brought higher prices.[8] Numerous types were in use, but perhaps the thin-chaffed wheats were most popular, for in a mildew epidemic of 1799 they showed themselves to be the most disease-resistant.[9] Individual preference seems to have been largely responsible for dictating the varieties which were grown, although some types were more suitable than others for particular climatic conditions.[10]

Rich clay soils and strong loams were recognised as most suitable for wheat, although other soils could be used if sufficient manure was

laid down.[11] Clay soils required deep and repeated ploughing to prepare them for wheat, and there was always the problem of water-logging which could greatly damage the crop. Kames recommended that ploughing be done in spring, then cross ploughing in July followed by two harrowings and two brakeings,[12] then manure was to be laid down and harrowed in.[13] Only then could the seed be sown, from September onwards. Loams were subject to weeds and care had to be taken to eradicate them, and this again involved repeated ploughing and harrowing.[14] Sandy soils were deemed unsuitable because they were so loose and acid, as well as retaining insufficient moisture, but wheat could be taken on such soils after red clover.[15] Wheat was usually given the best land.[16]

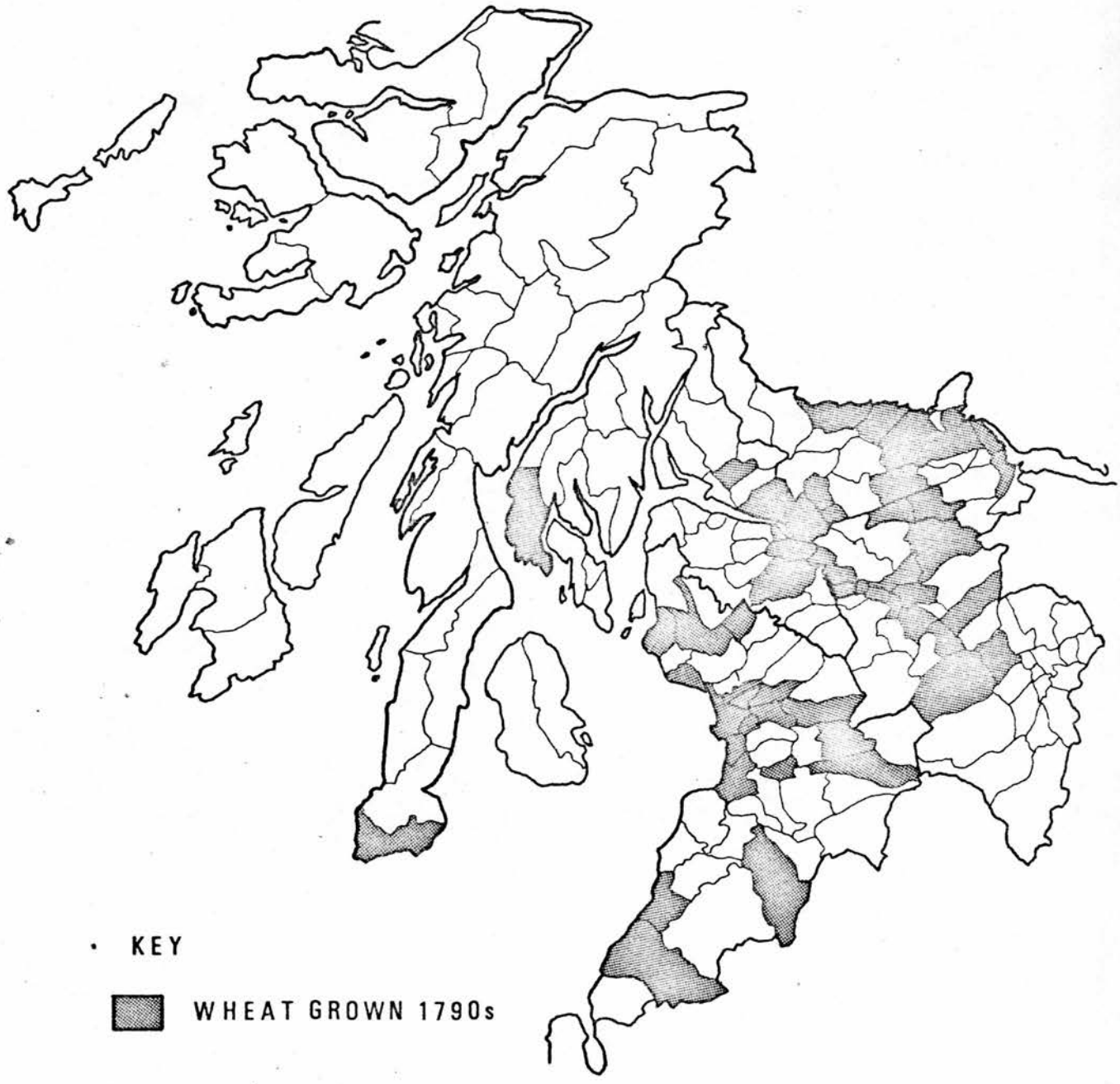
Wheat was subject to several diseases which damaged the produce; smut, blight, mildew and rust were the most common of these in Scotland.[17] Few precautions could be taken against them apart from the obvious one of using high-quality healthy grain as seed, but smut could be combatted by steeping the seed before sowing. This practice was very common. The best soaking solution was considered to be stale human or horses' urine, although sea salt could be used instead. When soaked sufficiently, the seed was drained and mixed with quick-lime.[18] It could then be sown with a much reduced risk of contracting smut. Sowing could be done broadcast or by drilling. Broadcasting was the most common method, but drilling was considered more suitable on lands infested with annual weeds, because hand-hoeing between the drills was then possible.[19]

Argyllshire c1790-c1830

In Argyllshire wheat was not a common crop. It was mentioned in the O.S.A. by hardly any of the parish ministers, although in nearly

MAP 4:1

WHEAT GROWING - SOURCE O.S.A.



MAP 4:2

WHEAT GROWING - SOURCE N.S.A.

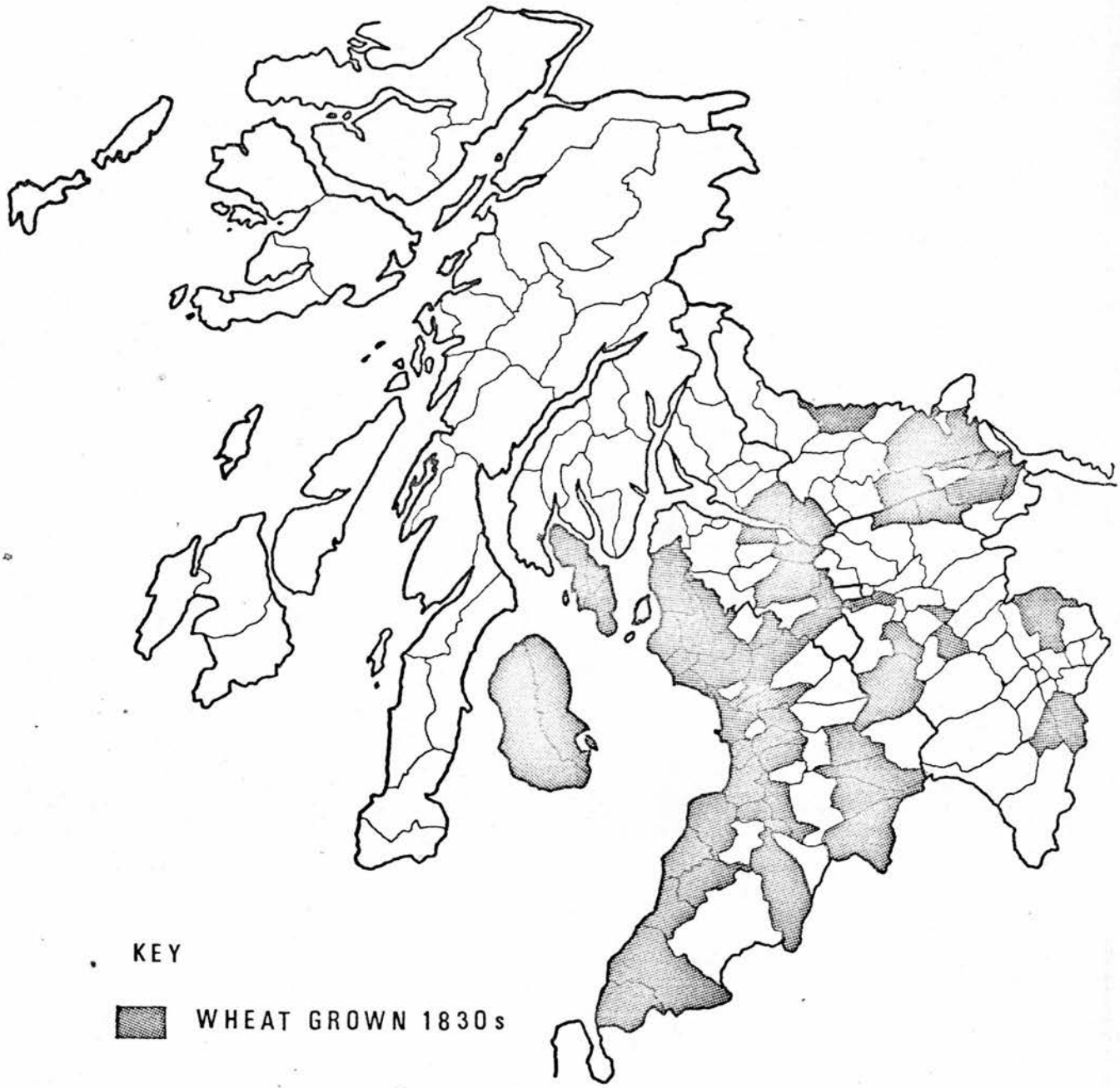
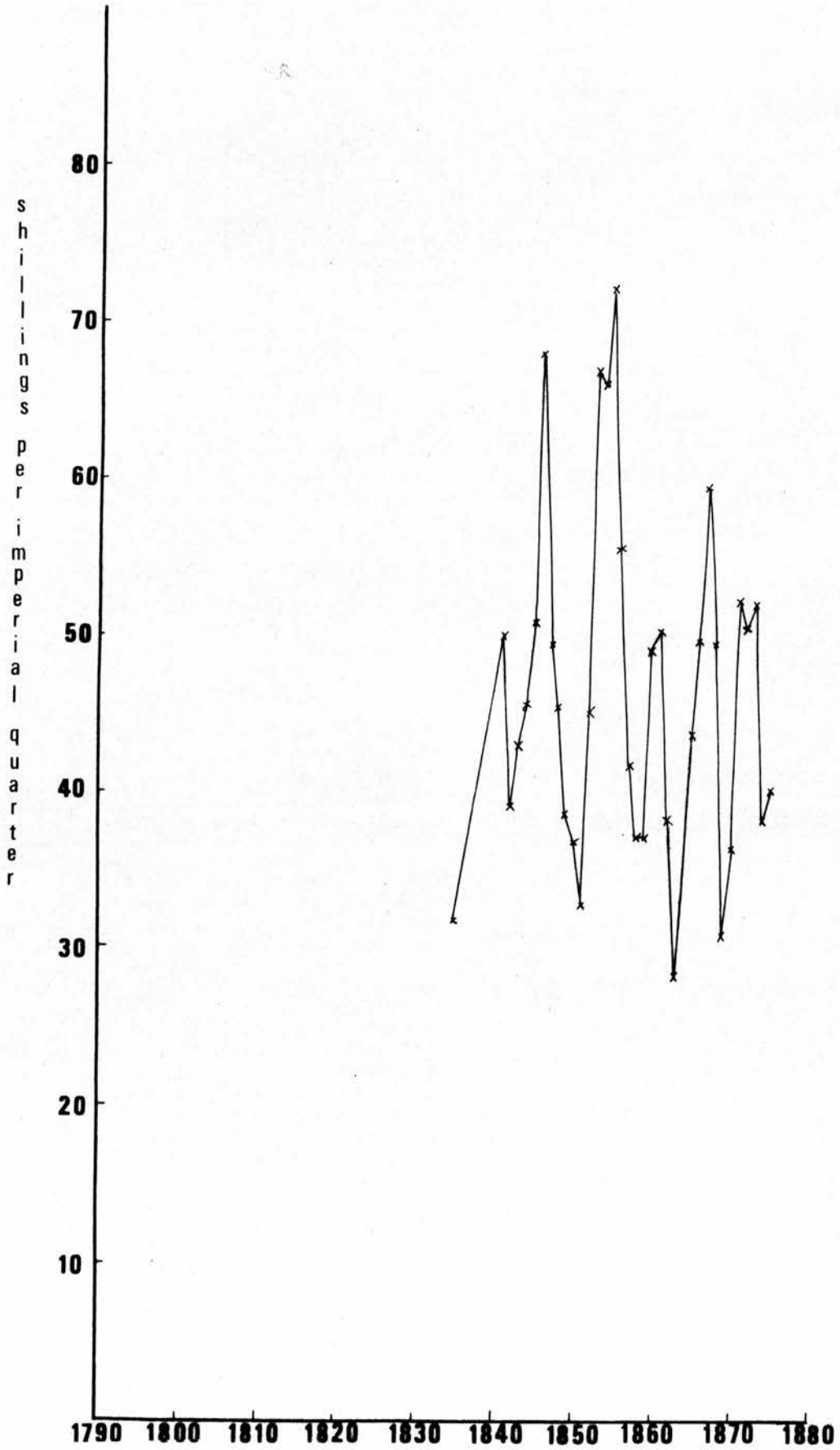


DIAGRAM 4:1

FIARS WHEAT ARGYLL



every parish crops were listed (see Map 4:1). In Kilfinan wheat had been tried by Lamont of Lamont, and had done well, but due to lack of knowledge of how to prepare the ground its growth did not spread.[20] In Southend partly underlain by the fertile Old Red Sandstone soils some wheat was grown, but elsewhere in the county it was not mentioned.[21] Smith remarked that the crop was frequently tried,[22] and as many of the parish accounts list only the chief crops, it is possible that this was the case, and that it was grown in small amounts over a wide area. Wheat had been found to do well on the deep loams and strong clays of Campbeltown, but it was not grown there chiefly because of the demand for bere for distilling, rather than as a result of unsuitable physical conditions or a lack of flour mills or of enclosures.[23] In the Hebrides it was only grown close to Islay House by Shawfield and his tenants, but there it was very well managed. It was sown on the strongest land after fallow or green crop.[24]

c1830-1854

By the 1830s wheat cultivation seems to have had no part in the agriculture of Argyllshire (see map 4:2). Even in Southend wheat growing had ceased, and it was not mentioned elsewhere in the county.[25] This decline was probably due to two factors. Firstly, in the 1790s there was a desire to experiment with the growing of crops which were found in the most agriculturally advanced areas of Scotland, especially if they were lucrative. This experimentation took place when some Argyllshire farmers were seeking to improve agriculture, and represents a phase in the development of a suitable local farming system. Secondly, the high prices of the Napoleonic Wars (see diagram 4:1) provided a substantial incentive to wheat cultivation even on lands where it might only have had a low success rate. By the 1840s these incentives had ceased to operate. It is possible too that small amounts of wheat were

grown in some parishes where it did not warrant mentioning.

1854-1873

At the agricultural census of 1854, however, there were 266 acres of wheat in the county,[26] and this was probably made up of small amounts on the lands of several proprietors in numerous parishes. This was true at the census of 1870, even though by then the wheat acreage had fallen considerably. At that time the 97 acres of wheat in the county were distributed through eleven of the 42 parishes,[27] and in none of them did it cover more than 0.62% of the cropped land (see map 4:3). In 1855 wheat covered 427¾ acres,[28] and rose to 685½ acres in 1856.[29] This was perhaps a reflection of the high wheat prices (Argyllshire fiars) in 1854 and 1855 respectively. In the event of higher prices wheat-growing farmers may have been induced to plant larger acreages, and non-wheat-growing farmers to try the crop. This is substantiated by the fact that in 1856 prices began to fall, and in 1857 the wheat acreage fell to 620½ acres.[30] By 1866 there were only 90 acres of wheat raised, and in the remainder of the period of study this never again rose above 115 acres (1868).[31] The lowest figure of 46 acres was achieved in 1874[32] (see table 4:2).

It is difficult to explain why wheat cultivation should have decreased so markedly in the 1830s only to develop again by the 1850s and to tail off into the 1870s, but possible reasons for this will be considered in the conclusion.[33] It is interesting to note that in 1870 Southend had the highest percentage of wheat (0.62% of the improved land), followed by Campbeltown with 0.34%. These parishes lie in the relatively fertile and forward-looking southern part of Kintyre, and were mentioned as being particularly suitable for wheat in the 1790s. Kilfinan had 0.02% of the improved land under wheat, and so continued to grow the crop on a small scale as it had in the

Table 4:2

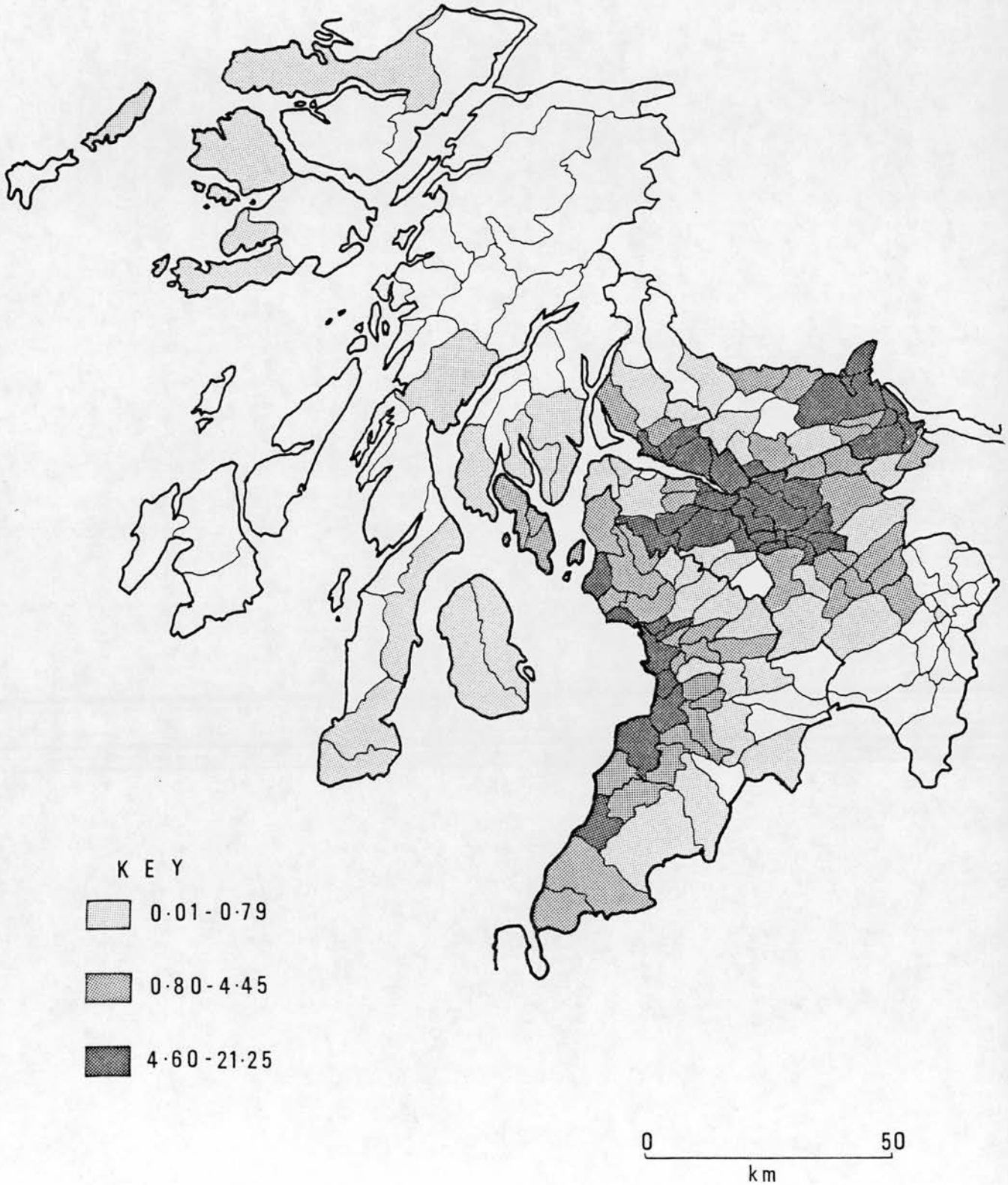
WHEAT ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	266	11187½	709¾	1628¼	6440¾	3973¼	3987¼
1855	427¾	12847½	1017½	2099	7582	4495¼	4985½
1856	685½	16897¼	1397	2543¾	8978¾	5211¾	5911¾
1857	620½	15692½	1070¼	2141	8363¼	4764¾	5312¾
1866	90	6164	293	1128	4486	2973	3580
1867	93	5653	259	1129	3930	2728	3385
1868	115	5840	367	1333	5112	3308	4036
1869	81	6766	343	1595	6180	3735	4112
1870	97	6778	368	1598	5838	3362	3818
1871	72	6964	395	1789	5962	3693	3930
1872	73	7431	283	1984	6519	3957	3889
1873	67	6461	252	1539	4828	3206	3347
1874	46	5961	168	1407	4664	3346	3383

MAP 4:3

WHEAT AS PERCENTAGE IMPROVED LAND 1870



1790s although in the mid seventeenth century several Cassillis tenants in parishes such as Maybole had paid their rents partly in wheat.[34]

Ayrshire c 1790-c1830

In Ayrshire before 1785 wheat had been found rarely outside gentlemen's farms. Its growth must have declined since then for in 1793 it was still not a general crop, although those who grew it obtained good results.[35] In the 1790s it was grown in 19 parishes,[36] (see Map 4:1) and was thus much more common than in Argyllshire. However, in most cases it was grown in very small quantities as an experiment. Only in Stevenston and Riccarton was it grown on a larger scale, and even there it was not a major crop, although it had been increasing in importance for some years.[37] In Stevenston, good profits were to be had from wheat on dry ground, and the crop was becoming more popular, especially on old rich leys.[38] In Sorn it had been recently tried on holm land and had succeeded well.[39] In Monkton, Galston where it had been tried for only a few years, and Colmonell the crop had done well, although it was sown in small quantities.[40] In Symington, Straiton, West Kilbride and Girvan wheat was stated to be precarious, and was therefore not popular.[41] In Kilmarnock, however, it followed potatoes; indeed, little was grown otherwise, though returns were good, and in Dalry, wheat was taken after potatoes or fallow.[42] Despite the seventeenth-century involvement of tenants,[43] it is likely that the small quantities which were grown in the county were sown mainly by gentlemen farmers; this was certainly the case in Dalry, while in Auchinleck only the Earl of Dumfries grew wheat.[44]

By 1811 wheat was included in all the best rotations and was reckoned to be reliable provided that the land was well prepared and

manured.[45] In 1793 red wheats had been the most common type, but by 1811 white, thin-chaffed varieties had also become popular, and spring wheat had recently been introduced[46] (a winter variety sown in January).[47] The seed was steeped to prevent blight, and it was sown broadcast then harrowed in.[48] Drilling was not used.[49] Fullarton considered Ayrshire wheat to be very good, but Aiton, a more skilled observer, recognised that it was of an inferior quality due to the damp climate, although he pointed out exceptions to this rule.[50] The best crops were had from clay soils at under 300 feet above sea level, which had long been cultivated and enriched with manure.[51] Clean clays properly fallowed, deep dry holms and light sands and gravels after potatoes and turnips were good for wheat,[52] but poor soils could also produce good crops if the correct rotations were used, and if 12-24 tons of dung and 40-60 bolls of lime per acre were laid down.[53]

The only information on wheat-growing between this period and the 1830s, is that it was grown on at least one farm on the Ballantrae estate in 1822, and on the Duke of Hamilton's lands in 1823.[54] Robertson found its cultivation to be increasing in the Cunningham division of the county c1820.[55]

c1830-1854

By the 1830s wheat had obtained a significant place in Ayrshire farming (see map 4:2). It was grown to some extent in many parishes,[56] although in some cases it had been tried and abandoned. In Stair, wheat had been used in the rotation at Barskimming but had been given up because it was prejudicial to the pasture, and in Dundonald it had been abandoned because of recent bad seasons.[57] In Mauchline c1800 wheat had been grown as part of a system of farming which imitated that of the East of Scotland. Wheat had received almost all the

manure, to the detriment of barley, and the system had succeeded because of the high war prices. With the return of peace it became clear that the soil and climate of the area were unsuitable and the system was abandoned.[58] Wheat had been grown for a considerable time in large quantities in Dundonald, but as a result of bad seasons it had been given up.[59] Similarly in Kilbirnie wet soils and a damp climate had resulted in partial failure of the wheat crop, and its growth had declined considerably in a short space of time. In 1836 there were said to be 120-160 acres under wheat, but this had declined to 40 acres in 1840.[60] Again in Kirkoswald about a quarter less wheat was sown in 1842 than had been the case in the recent past. Along the coast, however, the quantity was largely maintained.[61] In Largs at a similar date wheat had recently been sown little, and then only on heavy lands.[62] Although some wheat was grown in Coylton the soil and climate were reckoned to be unsuitable for it.[63] In Auchinleck, Dunlop, Tarbolton and Stewarton little wheat was grown, although there was some good wheat land in Tarbolton, and Cunningham of Lainslaw did sow wheat extensively on his lands in Stewarton.[64] In Dailly wheat was sown frequently after potatoes, in Girvan it was the principal crop, and in Monkton and Maybole, it was the most valuable one, while in West Kilbride it was raised 'to an imprudent extent' (nevertheless it was only 1:4 in proportion to oats).[65] In Girvan the success of wheat cultivation was attributed to the application of seaweed, but in West Kilbride it was recognised that the climate and soil were unsuitable. It may be significant that the account for these parishes was written in the late 1830s, that is the period just before wheat cultivation declined in Kilbirnie and Kirkoswald.

1854-1873

In 1854 there were 11,187½ acres of wheat in Ayrshire, and this

increased to 12,847½ in 1855 and to 16,879¼ in 1856.[66] (see table 4:2) As in Argyllshire this may be linked to rising wheat prices, and the similarity extends to a diminished acreage in 1857.[67] (see diagram 4:3) By 1866 the total had fallen dramatically to 6,164 acres, and it never again rose above 7,431 acres (1872).[68] The lowest figure of 5,653 acres was reached in 1867. Sturrock pointed out that although Ayrshire was not primarily a wheat-producing county it ranked fifth in Scotland. Also the wheat which was grown was raised chiefly from a strip of land along the coast. Inland it was sown in autumn, but the seaward potato land was sown with wheat in late November and the turnip land later still. The seed was still sown broadcast, but was sometimes ploughed in on the light holm land. Most varieties grown were white wheats, as these were preferred by bakers. Local seed was steeped in brine then rubbed in powdered lime, but English and East Lothian seed was sown untreated.[69] In 1870 only four parishes, in the upland east of the county, grew no wheat at all,[70] but in only a few parishes did it cover a sizeable proportion of the arable land (see map 4:3). With the exception of Irvine, for which no crop information was available, all of these parishes had grown wheat in the 1830s. All of them lie on the coast and probably grew wheat because of their slightly milder climate, although access to seaweed may have played a part.

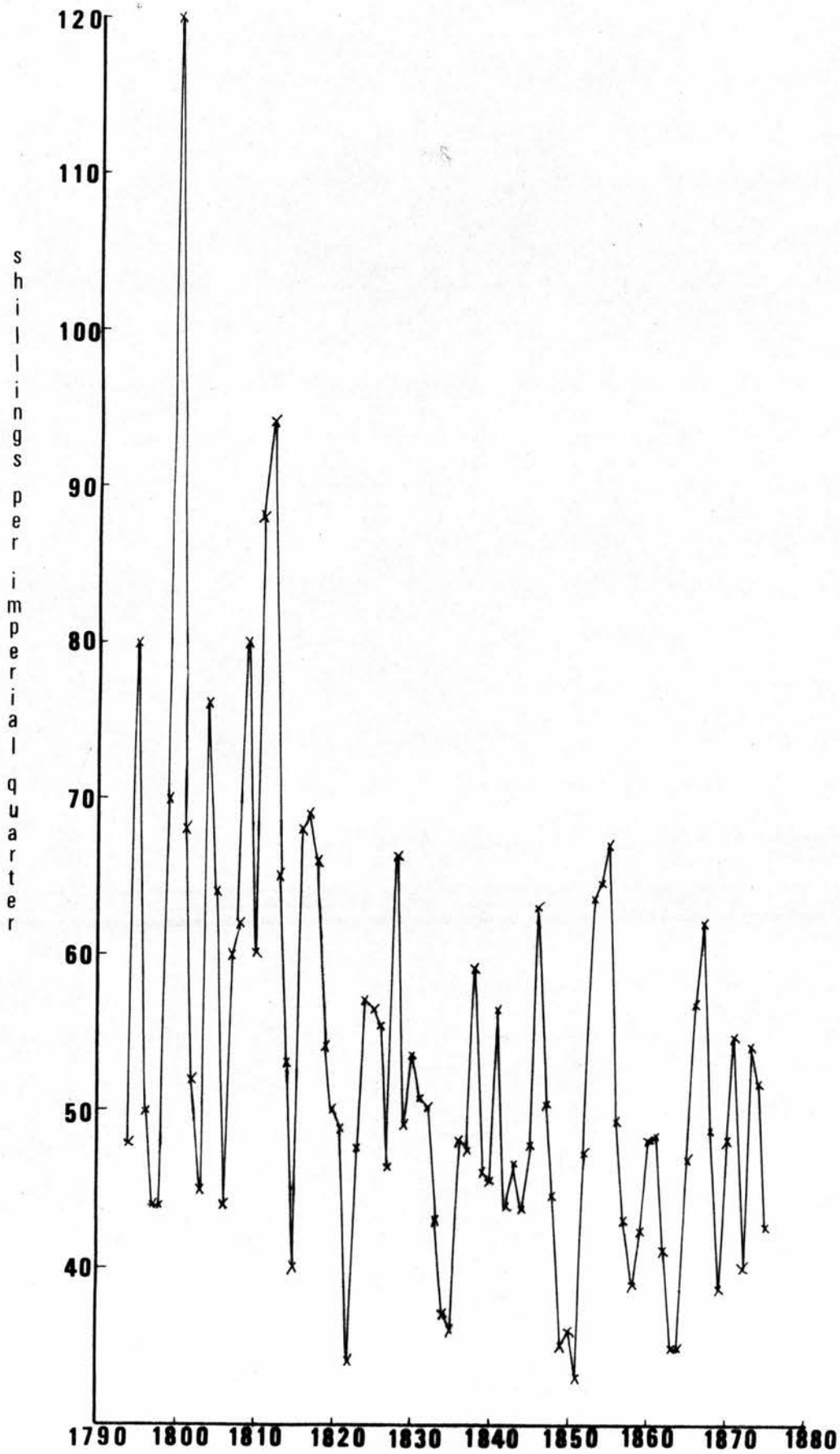
Buteshire

Wheat culture in Buteshire was not mentioned in the Old Statistical Account or in Heron's Agricultural Report. This may have been because there was no wheat, or because it was grown in such small quantities as to seem insignificant. By 1816 it was raised successfully in some parts of the island of Bute.[71]

By the 1830s wheat was found in both parishes in Arran, although

DIAGRAM 4:3

FIARS WHEAT AYR



in Kilmory one may infer that it was far from common, and in Kilbride the produce was 30 quarters as against 27 of oats.[72] Similarly in Bute wheat was grown in small quantities. There was 50 acres of it in Kingarth, compared with 610 of oats, while in Rothesay (N. Bute) there were 110 acres of wheat and 981 of oats.[73]

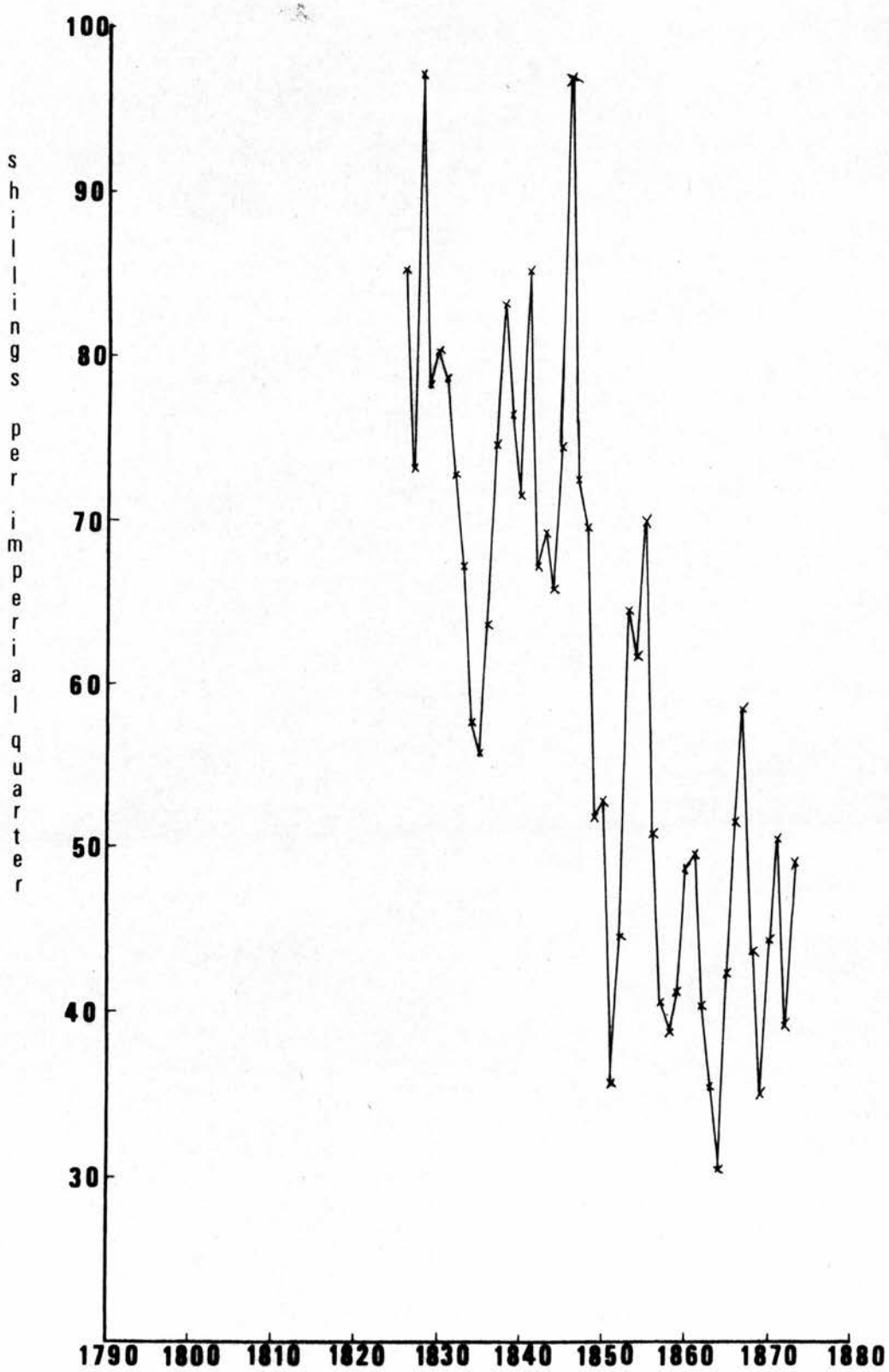
In 1854 there were 710 acres of wheat in the county, and as in other counties this increased in 1855 and again in 1856, but fell in 1857 in response to price fluctuations[74] (see table 4:2 and diagram 4:4). The total had fallen dramatically by 1866 and changes after that date were on a relatively minor scale.[75] Of the 368 acres grown in 1870 in Buteshire, 142½ were in North Bute and 89 in Kingarth, where they represented 3.52% and 2.45% respectively of the cultivated land.[76] This could be expected, as this island is less rugged than Arran (see map 4:3). Wheat was, however, grown in the latter in smaller amounts.

Dunbartonshire c1793-c1830

In Dunbartonshire in 1794 the wet climate and the early and late frosts were blamed for preventing wheat cultivation, although soils were considered suitable.[77] Consequently less than 100 acres of wheat were sown annually in the county. Nevertheless it was grown in Kirkintilloch, New Kilpatrick, Old Kilpatrick, Cumbernauld and Bonhill in the 1790s [78] (see map 4:1). In none of these parishes was it a major crop, indeed in New Kilpatrick a succession of poor seasons had reduced its cultivation markedly.[79] By 1811, however, it had begun to be grown on a larger scale, and covered between a sixth and an eighth of the land under cereals.[80] Red wheat was used because of its hardiness, but sometimes the red and white sorts were mixed because the bakers had a preference for white wheat.[81] In practice it had

DIAGRAM 4:4

FIARS WHEAT BUTE



been found to be sufficiently hardy. In 1808 spring wheat was introduced and proved itself satisfactory.[82] Seed was steeped in the usual manner, and mildew was unknown until the heavy August rains of 1808.[83] Dunbartonshire wheat was of a good quality and fetched a high price, although the quantity produced was not large.[84]

c1830-1854

By the 1830s wheat was raised on a moderate scale (see map 4:2). In Kirkintilloch it occupied about 6% of the arable land, and in Old Kilpatrick the proportion was about 7%.[85] In New Kilpatrick wheat always followed potatoes. It seldom failed and was relied upon to pay the rent.[86] This was a great improvement, for in previous times it had been a precarious crop. Its success was perhaps due to the greater availability of dung, and the attention to careful ploughing. In Cumbernauld a large area was under wheat, although 20 years previously the climate and the soil had been thought unsuitable for it.[87] Much care and abundant manure were,however, necessary.

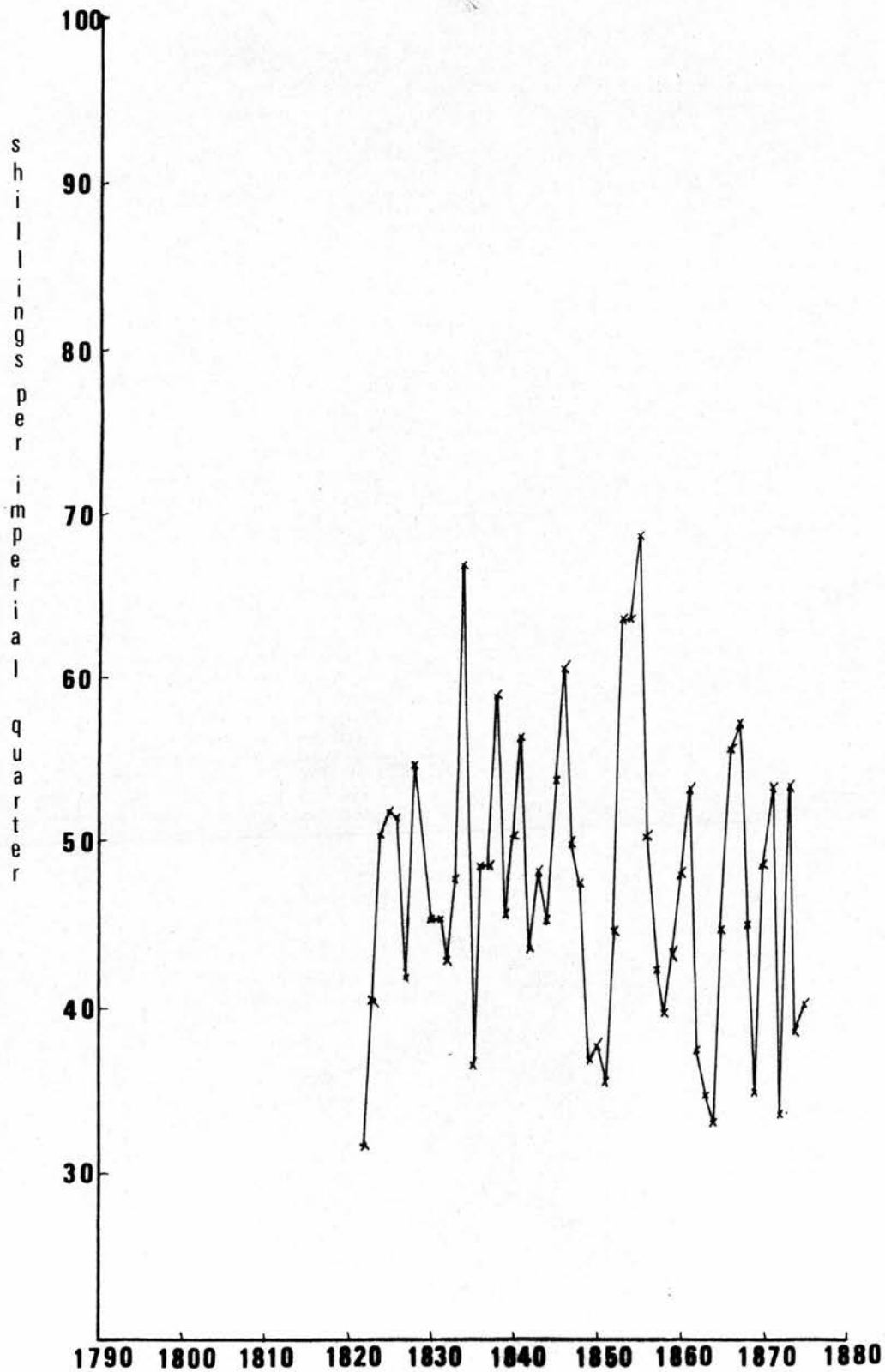
1853-1873

By 1854 there were 1628½ acres of wheat in the county, and this increased in 1855 and 1856 but fell slightly in 1857, again in line with price fluctuations[88] (see table 4:2 and diagram 4:5). In 1866 only 1128 acres were given over to wheat, although this had increased to 1984 acres in 1872, but declined again by 1874.[89] In 1870 only upland Arrochar and Roseneath had no wheat, although Kilmaronock, Row (Rhu) and Cumbernauld gave only small percentages of land to the crop[90] (see map 4:3). In Old Kilpatrick, however, wheat accounted for 8.96% of the improved land, a slight increase on the c1835 figure of 7%. New Kilpatrick had 7.02% wheat, Cardross 6.49% and Dumbarton 6.30%. In Kirkintilloch the percentage had fallen from 6% in c1838 to 2.68%.

In Dunbartonshire then, wheat was an important crop but there

DIAGRAM 4:5

FIARS WHEAT DUNBARTON



were marked contrasts between the upland and the lowland parishes. Wheat was almost entirely confined to the lowland areas, in which it had the greatest chance of success. The upland parishes, particularly Arrochar and Roseneath, show great similarities with most of Argyllshire where wheat was not really a viable proposition.

Lanarkshire c1790-c1830

Wheat was grown periodically in Lanarkshire in 1794, but never on "open soils, impervious bottoms and high places."[91] Spring wheat was seldom sown because of its propensity to fail.[92] The seed was steeped before planting and the land was prepared by use of town dung, farm dung and lime or even with horn shavings and woollen rags.[93] In the 1790s wheat was grown only in certain parishes, and then in small quantities (see map 4:1). In many parishes the crop was not among those listed as being grown, while in Lamington there was definitely no wheat raised, and in Douglas oats was the only grain sown.[94] In Blantyre, Bothwell, Lanark and Lesmahagow little wheat was grown, and in Stonehouse its cultivation had been tried and abandoned twelve years previously.[95] In Bothwell the limiting factor was a shortage of dung, while in Lesmahagow the crop was raised only in the low northern part of the parish. In Lanark, the scarcity of enclosures, high altitude and the lack of a flour mill were blamed. In several parishes wheat played an important part in rotations, and appears to have been one of the chief crops; for instance it was grown on the farm of Overnewton, Castlemilk.[96] In Cambuslang, wheat, potatoes, ryegrass and clover were responsible, from the mid-eighteenth century, for the payment of rents and wheat cultivation had gradually increased. Since that time it had become a favourite crop with those with land near the Clyde. It was found to do best on clay soils with the help of Glasgow dung,

but was sown on all types of soil.[97] In Dalserf and Hamilton wheat and oats were the chief crops. In Hamilton wheat generally followed fallow, but was sometimes sown after beans and peas, oats or potatoes. It was realised that it did not do well on the higher ground and spring frosts in 1783-1785 had discouraged its cultivation for a time.[98]

c1830-1854

Some changes had occurred by the 1830s (see map 4:2). In Lamington, good quality wheat had been raised, but the crop had been given up after the severe winter of 1836.[99] In Carnwath, little wheat was grown.[100] In the famous veal-producing parish of Avondale, some farmers had raised excellent wheat, while in Cambuslang it was sown cliefly on the rich level fields along the Clyde, particularly on clays.[101] Some parishes show actual acreages sown, and in others wheat was mentioned in the rotation.[102] In Bothwell, wheat occupied c9.5% of the cropped land, and in Hamilton it was sown on all the lands bordering the Clyde, and even in parts of the higher areas.[103] In Dalserf wheat and oats had remained the chief crops.[104] In Glassford wheat occupied more land than ever before (c1834), and in Culter where it had been rare until 2 or 3 years previously wheat was found on every farm, but in Dalziel it had begun to decline due to low prices (c1835: this ties in with the fiars -see diagram 4:6).[105]

1854-1873

The pattern in the 1850s in Lanarkshire is similar to that of other counties. In 1854 there were 6440¾ acres of wheat and this rose in 1855 and 1856 and then fell in 1857.[106] Once again this ties in closely with prices (see table 4:2 and diagram 4:6). As with the other counties the 1866 figure was much reduced; 4486 acres, and this never again rose above 6579 acres (1872).[107] The lowest acreage, 3930 acres, was reached in 1867.[108] In 1870 wheat was raised in 24

of the 39 parishes of Lanarkshire (see map 4:3).[109] It was still not grown in Lamington and Carnwath, and the upland parishes are once more the ones in which there were low acreages or no wheat at all. In 1864 there were three acres of wheat in Wiston and Roberton and two in Dolphinton as opposed to zero in 1870.[110] The haughs of Carluke were well adapted to wheat cultivation in a limited way, but the rest of the Upper Ward was thought unfit for wheat; it had been more common there formerly when it had been difficult to obtain it from elsewhere.[111] In Bothwell it occupied only 5.98% of the improved land (c9.5% in the 1790s).[112] The largest percentages were still in the Clyde valley parishes of Old Monkland (11.38%), Govan (11.96%), Cambuslang (11.33%), Rutherglen (21.21%) and Glasgow Barony (13.19%).

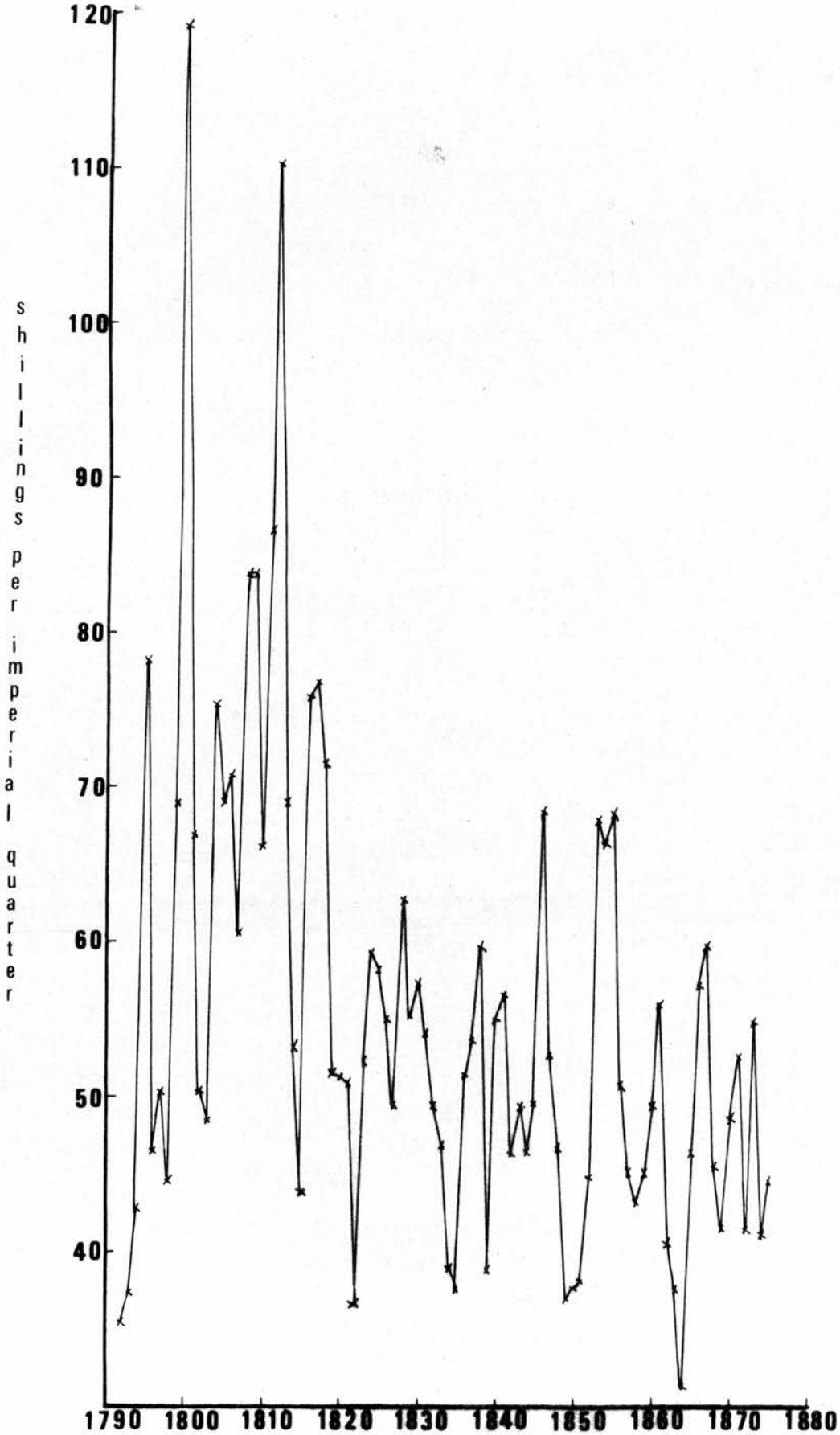
Wheat was grown in many Lanarkshire parishes during the period, but as in Dunbartonshire there is a contrast between upland and lowland areas. The chief wheat-growing parishes were in the lowlands where the crop had most chance of success. Lower prices in the 1830s may have caused a slight decline in wheat growing.

Renfrewshire

In Renfrewshire only small quantities of wheat had been sown, although as elsewhere it had increased in importance by 1812.[113] In Cathcart in the 1790s wheat was taken after potatoes, and accounted for 100-150 acres of the parish.[114] In Paisley wheat was grown on a small scale but was increasing in importance, and in Renfrew it was one of the important crops, while in Inchinnan all kinds of grain were grown.[115] In Erskine, however, wheat appears not to have been successful, and in Houston and Killallan, although wheat had been grown on lowland farms, its cultivation had been abandoned as troublesome and unprofitable.[116] In Kilbarchan too, wheat had failed due to autumn

DIAGRAM 4:6

FIARS WHEAT LANARK



rains.[117] Wheat then was by no means a well-established crop.

In the N.S.A. there is a paucity of information on the crop (see map 4:2). It would seem, however, that wheat played a significant part in rotations, at least in the lower areas. In Paisley wheat was raised in the lower division and in every parish for which crops were listed wheat was mentioned.[118] It was included in the rotations of several parishes and this was probably true of others for which crops were not mentioned.[119] In 1854 there were 3973¼ acres of wheat and this increased in 1855 and 1856, while in 1857 the figure fell.[120] As with the other counties the acreage had fallen markedly by 1866 to 2973 acres.[121] It rose again to 3957 acres in 1872, but fell in 1873 and recovered only slightly in 1874 (see table 4:2).[122] In 1870 there were only two parishes in which wheat was not grown, Eaglesham, which was unsuitable for wheat cultivation, being high-lying, and Port Glasgow which was small and highly urbanised (see map 4:3).[123] In Mearns, Neilston, Paisley, Innerkip and Kilmacolm, however, it was grown on only a small percentage of the improved ground. These were mainly upland parishes, or lay on the windward side of the uplands. Paisley appears to have concentrated on market gardening. The chief wheat-growing parishes were Renfrew, Cathcart, Govan, Paisley Abbey, Inchinnan and Eastwood, all lowland parishes with good soil and situated close to urban areas.

Stirlingshire c 1790-c1830

In Stirlingshire, around 1760 the old infield-outfield system began to change and gradually farmers began to adopt new practices. By 1796, among other improvements, wheat was being sown on summer fallow.[124] Wheat was well suited to the heavy marine clays of the carselands once they had been cleared of the thick overlying cover of

peat. In Kilsyth c100 acres were sown annually, whereas 16 years previously little had been grown.[125] The crop was sown mainly in winter, although occasionally spring wheat was cultivated.[126] It was sown broadcast and then harrowed in, and as usual the seed was steeped. 40-50 carts of dung and four to eight chalders of lime per acre were laid down with the crop.[127]

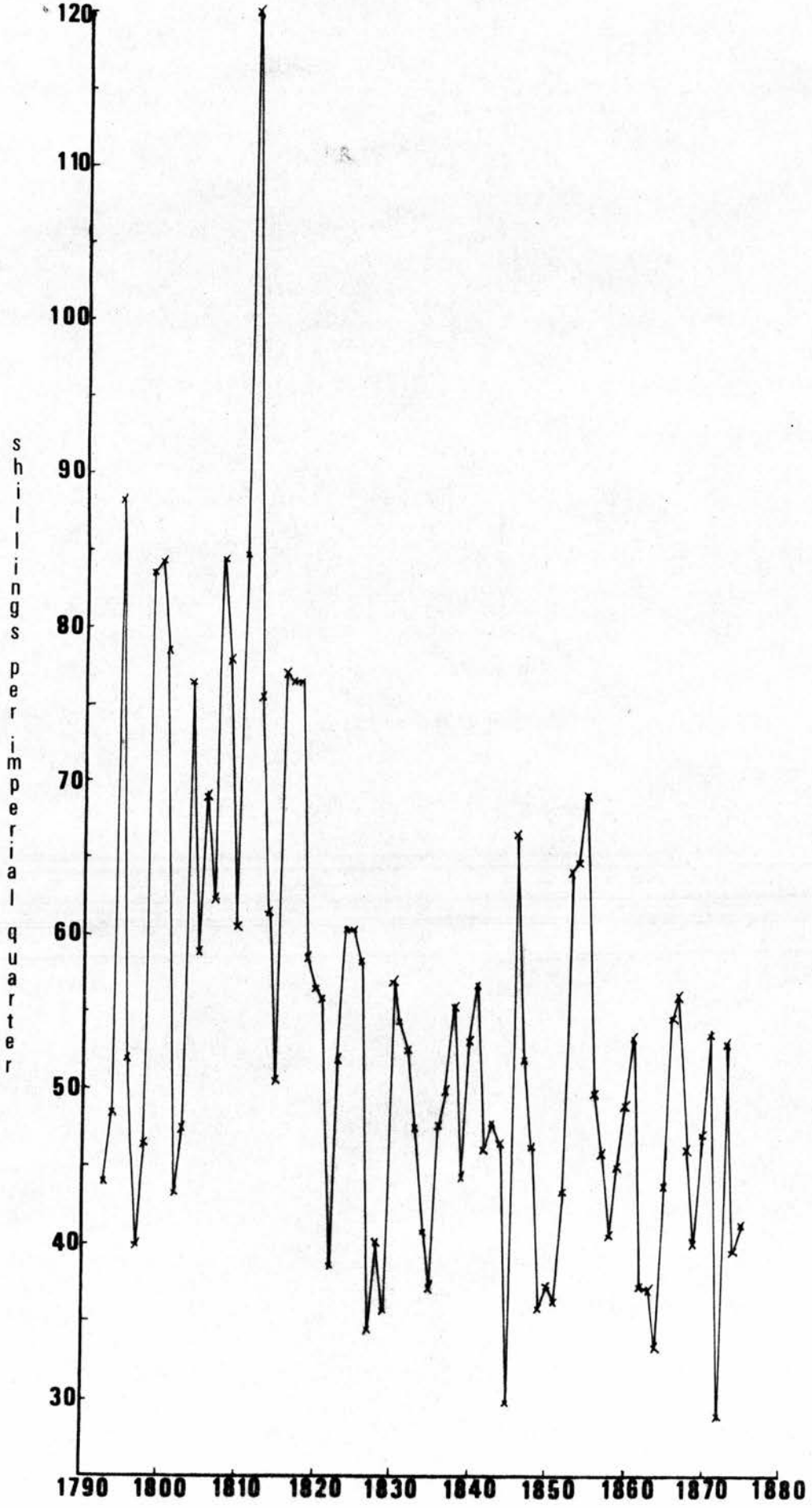
In the 1790s wheat was sown in only a few parishes in Stirlingshire and in some of them it was grown only in small amounts (see map 4:1). In Strathblane only one farmer had successfully tried the crop because dung was scarce.[128] In Kilsyth wheat was relatively uncommon because the rich valley land suitable for its cultivation was unenclosed although as we have already seen its cultivation was increasing.[129] In Killearn the climate was considered unsuitable, and in Kippen the weather restricted its growth to the Carses.[130] In Denny there was no wheat at all.[131] However, in Baldernock it had been found to do well even on flooded ground.[132] In Airth not every farmer sowed wheat, but it was a major crop, and there is mention of it having been grown there in 1808 and 1812-1816.[133] In Gargunnock at least one field of wheat was found on every farm.[134] In Alva, St. Ninians and Bothkennar too, wheat was included in the rotations.[135] By 1812 its cultivation was extending towards the western part of the county.[136]

c1830-1854

In the 1830s wheat was fairly widespread but was grown chiefly on the Carse (see map 4:2). It formed part of a six-course rotation in the Carses of Bothkennar, Falkirk, Larbert, Polmont and St. Ninians and probably in other parishes too.[137] Wheat was less prolific on the dryfield land although in Kippen and St. Ninians some was grown, but not in Logie and Stirling.[138] In Kilsyth, wheat had been introduced during the agricultural improvements which followed the 1790s.[139] It is interesting to note that in Dunipace wheat replaced flax, which had

DIAGRAM 4:7

FIARS WHEAT RENFREW



been abandoned due to foreign imports.[140] It had been customary to give this crop the choicest land and dung, which wheat also required, so perhaps this change in land use may have occurred elsewhere and may help to explain the increase in wheat cultivation. In Slamannan too flax had lost popularity, but there is no evidence for wheat having superceded it.[141]

1854-1873

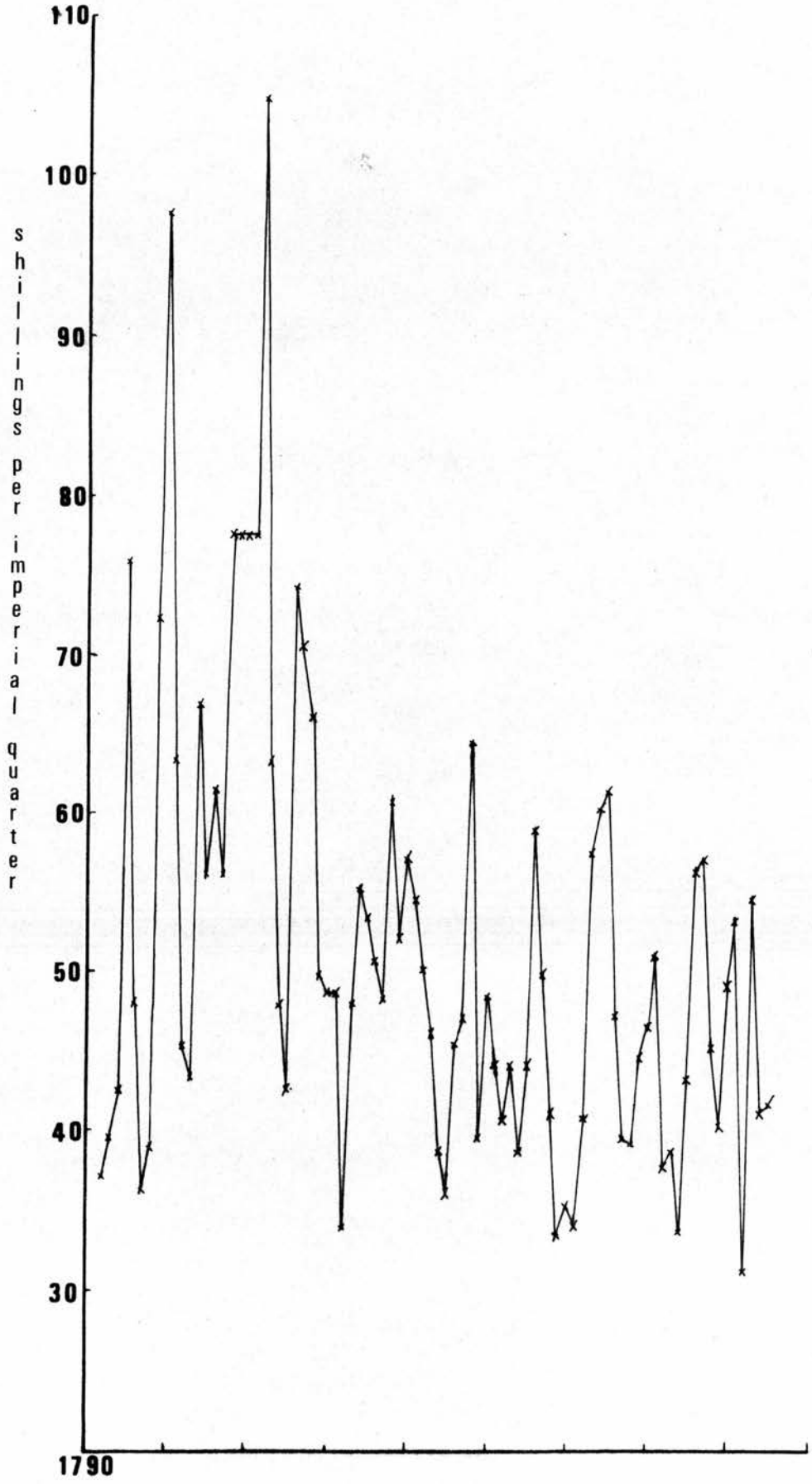
In 1854 there were 3987¼ acres of wheat in the county, and as in other counties the acreage rose and fell in response to prices (see table 4:2 and diagram 4:8).[142] By 1866 the figure was 3580 acres and it never rose above 4112 acres, which was reached in 1869.[143] In 1870 there were three parishes growing no wheat and in several substantially upland parishes it occupied a very low percentage of the land.[144] The chief wheat-growing parishes were still those with large areas of carseland; Bothkennar, New Kilpatrick, Airth, Stirling, and Polmont (see map 4:3). It is interesting to note that in no parish did it occupy a very high percentage of the land, and that it was an important crop in comparatively few parishes, perhaps because a good deal of less fertile land was also included in these parishes.

CONCLUSION

Wheat was grown in all the counties throughout the period, but the pattern of its growth was a changing one. The crop was most commonly found in the lowland areas, in areas with a mild climate and on the rich clay and loam soils to which it was best suited. It was grown widely but in small amounts. In many parishes this was stated, but in others where wheat was omitted, it is probable that the sources considered only major crops. In some instances wheat had been tried

DIAGRAM 4:8

FIARS WHEAT STIRLING



and abandoned for reasons such as shortage of manure, bad weather, or because the crop was too troublesome. As it was abandoned in some areas, it was tried in others, and in some cases it was found to be successful and worth the necessary effort. Wheat culture was practiced in some localities simply because of the interest of particular landowners, while in others environmentally better suited to wheat the crop was not grown. In Dunbartonshire and Argyllshire, and to some extent in Buteshire and Lanarkshire, wheat was concentrated in the lowland areas, but even here it required careful attention, and if it was felt to be worthwhile it was not given a high percentage of the land. Basically wheat was not the most suitable crop for cultivation in northern Britain, but because it was valuable it was grown to a greater or lesser extent throughout the area and period of study.

In Ayrshire and Dunbartonshire wheat growing increased steadily from the 1790s into the 1830s and this was probably the case in Stirlingshire too. There is insufficient evidence of change in Lanarkshire, Buteshire and Renfrewshire, but in Argyllshire, wheat cultivation declined markedly. This was probably due to a realisation that the crop was not really suitable for the county and to declining prices after the Napoleonic Wars.[145] In the 1850s fluctuations in the quantity of wheat grown correspond for every county. The acreage increased from 1854 to 1856 but fell from 1856 to 1857. This follows fiars prices closely, and it is possible that at this period wheat-growing responded in a fairly simple way to changing prices (see diagrams 4:1, 4:3, 4:4, 4:5, 4:6, 4:7 and 4:8). The largest percentage increase between 1854 and 1856 was in Argyllshire where wheat was most marginal. Probably elsewhere it would still be profitable for farmers to grow it even if prices were not very high, but in Argyllshire this would not be true. The fact that there was approximately a $2\frac{1}{2}$-fold increase from 1854 to

1856 demonstrates the lucrative nature of wheat cultivation if the price was at all suitable.

From 1866 to 1874 the pattern is less ordered and more difficult to interpret. In all counties, marked decreases in wheat acreage had occurred since 1857, probably as a response to the general downward price trend of wheat. However, price and acreage fluctuations do not correspond on a year-to-year basis. By this time the prohibitive effect of long carriage must have been less marked. It is likely that some areas which had grown wheat for local consumption were able to import it readily. This is indicated by Irving and Murray.[146] The greatest relative fall after 1857 was experienced by Argyllshire, the 1866 value being about a seventh of that of 1857, while in other counties there was a less marked decrease or even a small increase. It may have been due to the growing of wheat on many areas of marginal land which were basically unsuited to wheat and could only bear one, or at most two, wheat crops before having to revert to a less exhausting crop, and in this respect could well represent short-term opportunism on the part of Argyllshire farmers. A similar, but less marked, pattern may be seen in Buteshire, and this is likely to be due to the same cause. The general pattern was one of slightly increased acreages until 1872 (with some small decreases). This is probably a response to price fluctuations and to the increasing competition of foreign producers (partly reflected in the falling price trend) at the start of the so-called Great Depression. In every county the wheat crop had lost most of its former importance by the end of the period, but wheat retained its supremacy as the bread grain of choice.

2. BARLEY

After wheat, barley was and is the next most valuable British grain, it is more hardy than wheat, and better suited to Scottish conditions.[1] There were two basic types of barley in common use in Scotland; the two-rowed and the four-rowed types.[2] The latter might be known as bere, bigg or bear, and within each type there were several varieties.[3] Rothripe barley, a common type in Southern England, was found useful on thin soils and in late situations.[4] Scotch barley or bere was a hardy type which had been sown from early times. It was quick-growing, could be sown late and harvested early (very useful in Scotland where the growing season was short), and it would grow on acid soils on which the two-rowed types might not grow at all or would give poor results.[5] It was popular with distillers, but did not produce as much per acre as the other type.[6]

Barely was a popular crop because of its use in brewing and distilling, although it could also be made into bread. Sinclair felt the crop to be less cultivated in 1814 than formerly because of a diminution in its use as bread corn, and the heavy taxation on distilling and brewing.[7]

Barley requires a mellow soil,[8] and care is necessary when planting it in clay.[9] Kames recommended two ploughings and one brakeing before sowing the seed in April. On loams and light soils, less ploughing was considered necessary.[10] The mode of preparation varied according to the preceeding crop. After turnips the ground was ploughed only once, unless very cloddy in which case a second or third ploughing were usual.[12] In the old infield-outfield system, barley was such an important crop that it had been allowed all the farm manure. As agriculture developed, this was more rarely the case.[13]

Normally barley was sown broadcast although it could be drilled like wheat[14] in which case hand-hoeing was necessary.[15] It was common for ryegrass seeds to be sown with the barley to ensure a good grass crop when the grain was harvested.[16] This could also be done with other grains, and was common with oats as well as barley, but wheat was not usually sown down because it was a bad 'nurse' for the grass.[17] Barley was not steeped like wheat, for it was not subject to the same diseases, although some farmers may have done this in order to hasten germination and to remove empty husks.[18]

Argyllshire c1790-c1830

In 1794 true barley was raised near Inveraray and Campbeltown, and bere was found in Kintyre, at Inveraray and on infield land in Lismore.[19] The crop was almost certainly grown elsewhere in Argyllshire as well, for by 1813 bere was raised on all soils which could bear it, ie. dry, mellow, weed-free and well-manured land.[20] The crop was popular because there was a great demand for it from distilleries. Smith was highly critical of the use of a potential food for distilling, and in 1813 estimated that about 20,000 bolls annually were converted into whisky, chiefly in Kintyre.[21] In the Hebrides bere formed half the crops. Only in Gigha and a few farms in Islay was real barley sown. Bere ripened three weeks earlier, needed a less fertile soil and less manure.[22]

In the O.S.A. barley or bere was mentioned in almost every parish; in Saddell and Skipness it was included in the rotation on the infield or wintertoun, and in Morvern and S. Knapdale it was a major crop.[23] The returns varied, but were generally fairly low (see table 4:9). Only in Kilninian was a better ratio mentioned; there a

return of 6-10 to 1 was obtained, and in old ground the return could be as much as 16 to 1 if seaware was applied.[24] In contrast in Lismore and Appin despite the abundance of lime, returns were poor because land was worked before it had rested sufficiently.[25] In the Kintyre parish of Southend much barley was raised in excess of the inhabitants' needs, and 400 bolls per annum were distilled in the parish, while 100 bolls were sent to Campbeltown for this purpose.[26] In Campbeltown itself bere was the chief crop after potatoes and was depended upon for the payment of rent, 7634 bolls per annum were distilled there of which 5000 were produced in the parish.[27] In Kilmartin too the crop was raised for whisky, and in Kildalton distillers lent the farmers money to prepare for barley provided that they could buy it for about 17/- per boll instead of the usual price of more than £1.[28] In 1813 although bere was an important crop, true barley was almost unknown in Argyllshire.[29]

c1830-1873

In the 1830s barley was still a popular crop although it is possible that its importance had declined slightly since the 1790s. Wheat competed for the dung, which in the traditional system had been given to barley. This was because of a greater demand for wheaten bread, and of improvement of land. On moors wheat did not compete, and barley remained paramount.[30] In Dunoon barley was grown less that in the past because oats gave a better return, but in Kilfinichen it was raised for the distilleries of Oban and Tobermory.[31] In Killean, maltsters from Campbeltown advanced cash to farmers for the payment of rent on the condition that barley could be bought at a reduced price.[32] It is possible that changes in the pattern of distilling caused barley to be less popular than previously, but it is also possible that the paucity of detail in the N.S.A. occurred because

barley was such a well-known crop and its description was considered superfluous. By 1854 there was a substantial acreage of barley in Argyllshire (3546½ acres). This fell in 1855 and 1856, but rose again in 1857.[33] By 1866 there were 2135 acres of barley, and this had increased by 1870.[34] It fell until 1873 but picked up again by 1874 when there were 2209 acres (see table 4:10 and diagram 4:11).[35] In 1870 there were five parishes in which no barley was grown, but there were many others in which it accounted for only a low percentage of the improved land (see map 4:4).[36] Only in Tiree was the figure of 16.80% reached, and the next highest percentages were 5.94 in Campbeltown, 5.70 in Southend and 5.40 in Kilfinichen and Kilveachen. Kintyre had retained its interest in the production of barley for distilling.

Ayrshire c1790-c1830

In 1793 bere was raised, although true barley was much less popular.[37] In 1811 bere cultivation had declined since heavy duties had made it unprofitable for distilling.[38] In the O.S.A. the crop was mentioned in almost every parish, although in some it was raised only in small quantities, and was invariably less important than oats.[39] In Kilmaurs and Galston only a little barley was grown because the climate was thought unsuitable for it.[40] In Ballantrae only a few acres of bere were planted, but in Kirkoswald where it was raised for malting it was second in importance to oats.[41] True barley was also grown but in smaller amounts as it was a less certain crop.[42]

c1830-1873

By the 1830s barley was not grown universally but it was a popular crop. It was not mentioned in several parishes in which crops

Table 4:9

CROP YIELDS FOR SELECTED PARISHES IN 1790S

(Yields are given as the return per seed planted)

Parish	Oats	Barley	Comments
Colmonell	3-4 or 6-9*		* the higher yield was obtained from land rested then enriched with lime and dung.
Craignish	3	4	
Glenorchy and Inishail	3-4	5-7	
Jura and Colonsay	2½		
Killarrow and Kilmeny	3-4	4-5	Greater yields could be obtained by use of shell ware or lime.
Kilbrandon and Kilchattan	3-4	5	
Kilcalmonell and Kilberry	2½	6	
Killean and Kilchenzie	3½	6	
Kilfinan	3-4	6-7	
Kilmalie	3	5	
Kilmartin	3½	5½-6	
Kilmore and Kilbride	3-4	5-6	
Kilninian	3	6-16	
Lochgoilhead and Kilmorich	3½	4-5	
Luss	4½	8	
Morvern		4-16	
Tiree	2½	4	

(Source - O.S.A.)

Table 4:10

BARLEY ACREAGES

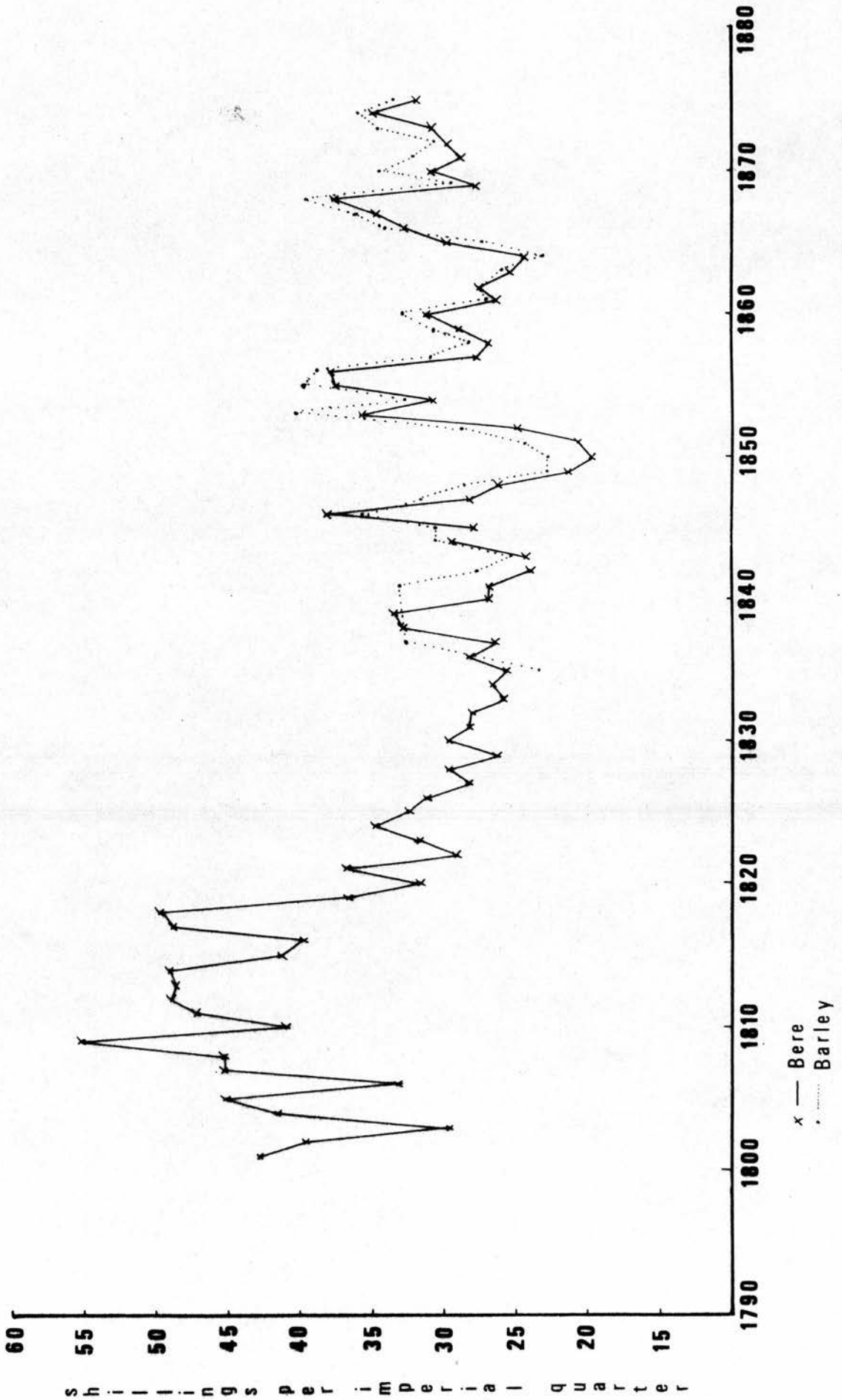
(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	1658¼	802½	289½	1418	2290¼	421½	7337
Bere	1888¼	217¼	159¼	14½	252½	55¾	47½
Total	3546½	1019¾	448¾	1432½	2542¾	477¼	7384½
1855	1240¼	682¾	172½	957	2037¾	428¼	6773
Bere	1814¾	288¼	133¾	27¼	369¼	84½	18
Total	3055	971	306¼	984¼	2407	512¾	6791
1856	1197¾	698¼	154	946½	1787½	343¾	6444¼
Bere	1536¾	293½	118¾	27¼	299¾	70¾	30½
Total	2734½	991¾	272¾	973¾	2087¼	414½	6474¾
1857	1442¾	884¼	223	1077¾	2142¾	417¼	6953½
Bere	1587½	284½	152¾	2½	343¼	106½	36
Total	3030¼	1168¾	375¾	1080¼	2486	523¾	6989½
1866	2135	1081	250	393	911	234	4992
1867	2020	1061	237	376	884	176	5108
1868	2106	1295	221	325	721	174	4908
1869	2280	1351	265	414	877	140	4683
1870	2722	1434	287	409	1146	250	4995
1871	2653	1448	337	417	983	237	5365
1872	2456	1142	374	247	780	185	5006
1873	2193	1411	337	397	915	343	5237
1874	2209	1412	298	356	685	259	4954

N.B. 1866-74; figures are totals of barley and bere

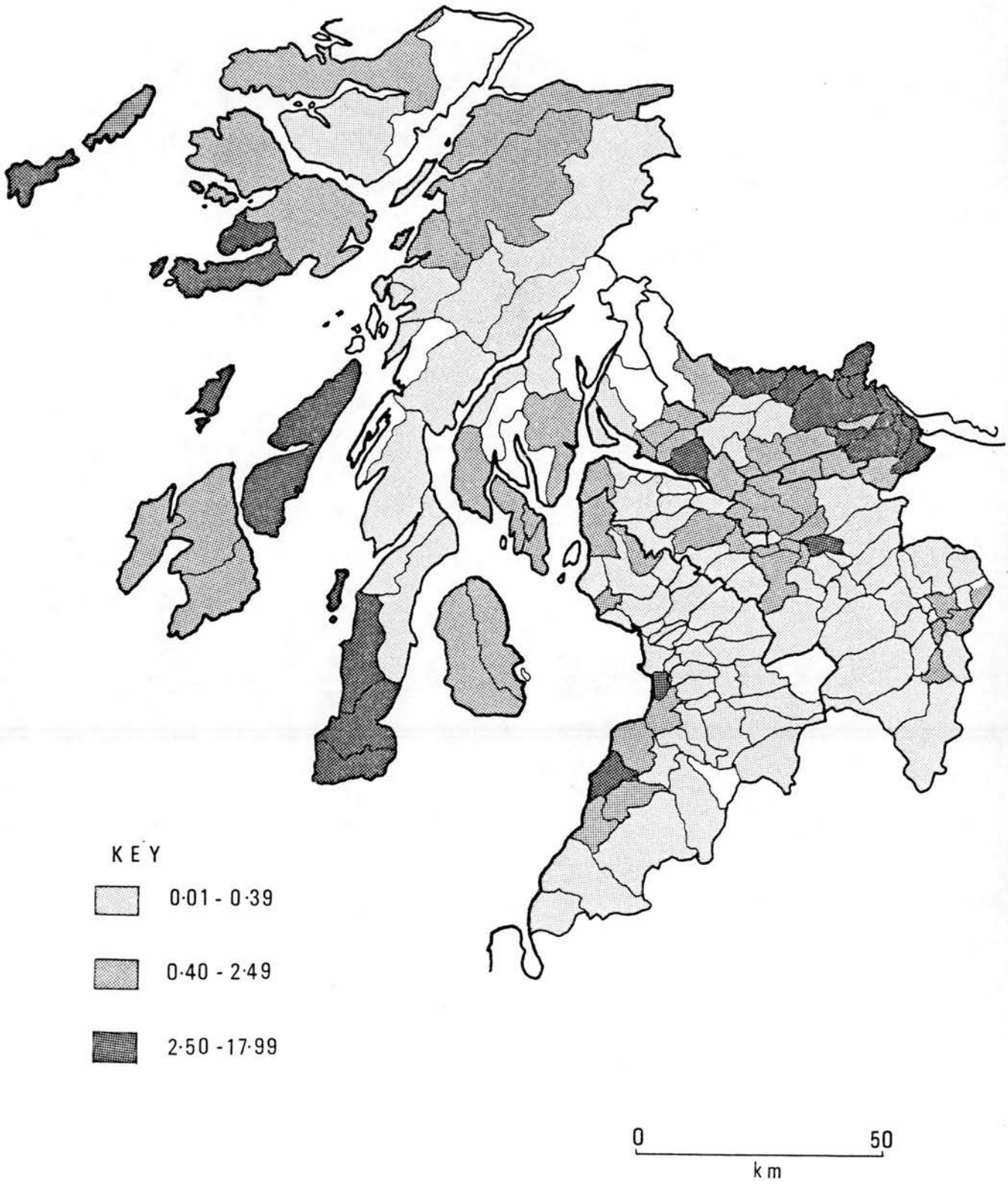
DIAGRAM **4:11**

FIARS BARLEY/BERE ARGYLL



MAP 4:4

BARLEY AS PERCENTAGE IMPROVED LAND 1870



were listed and it was definitely not grown in Kirkoswald.[43] In Auchinleck barley was more extensively grown than wheat, but in Craigie only 6 acres of barley were raised as apposed to 13 of wheat, and in Monkton little barley was grown (value £119 c.f. of oats £2855).[44] In Dalrymple and Dunlop sufficient was grown for family use but not for commercial purposes.[45] Bere was not mentioned separately in these parishes, but may have been grown.

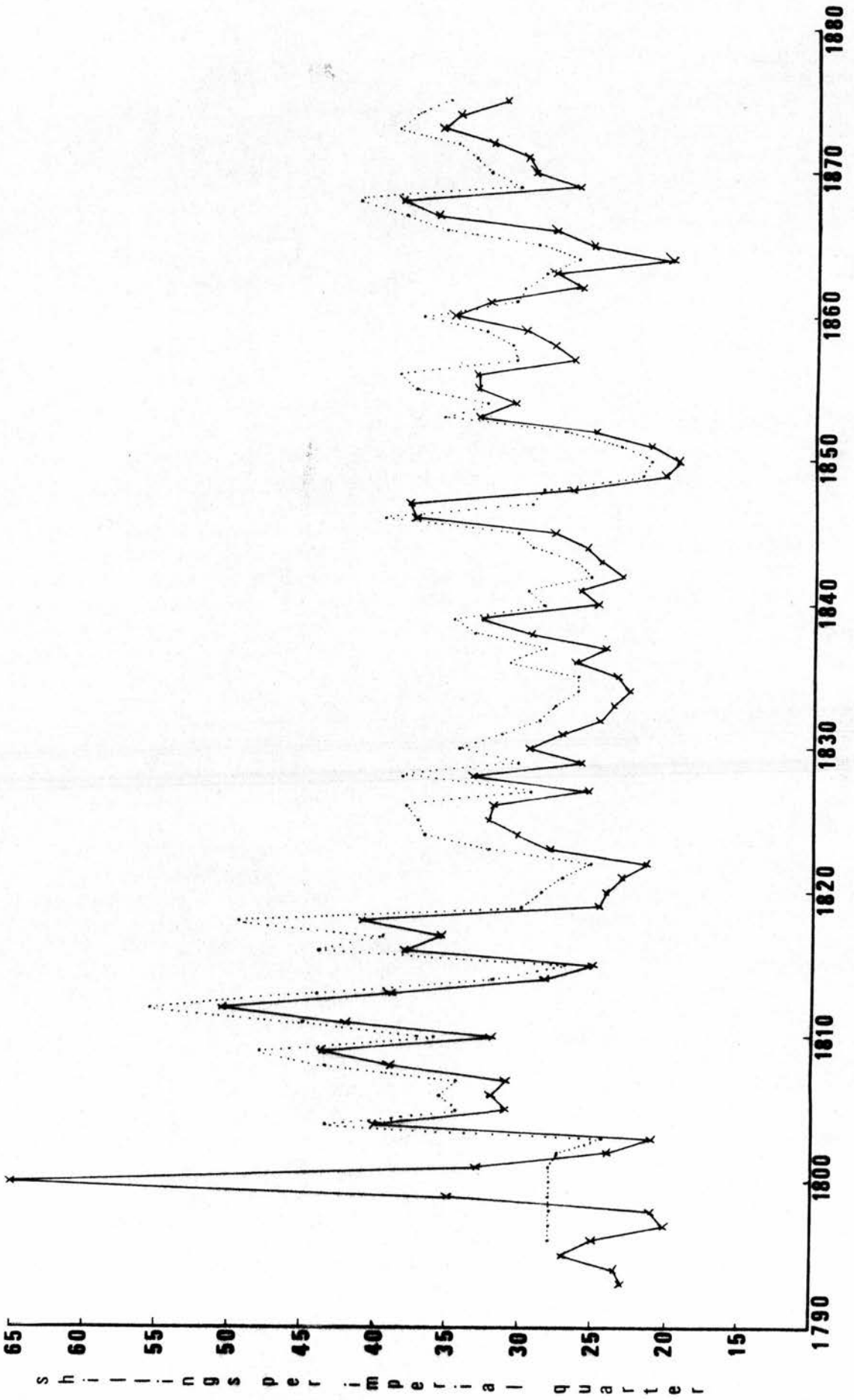
In 1854 only 1019¾ acres of barley were found in the county and this fell to 971 acres in 1855, rising again to 991¾ in 1856 and 1168¾ in 1857 (see table 4:10 and diagram 4:12). By 1866 the acreage was 1081 acres and the total fluctuated throughout the remainder of the period.[46] Sturrock maintained that in inland areas bere and barley were grown only in occasional patches for home use. He felt that the crop had declined as a result of wet harvest weather, but pointed out that its growth was increasing in St. Quivox and the Carrick shore. A Mr. James Wright of St. Quivox (Forbes of Callendar's estate) was one farmer who favoured barley on his light land because his returns of wheat had been poor for several years.[47] In 1870 only in Dalmellington and Muirkirk was no barley grown, although in most parishes the crop occupied a very low percentage of improved land (see map 4:4).[48] The highest percentages were 5.26% in Monkton and 5.09% in Kirkoswald, the next largest being 2.34% in St. Quivox and 2.13% in Newton-upon-Ayr. It would appear that barley was a crop grown over a wide area, but in small amounts chiefly for home consumption. It is interesting to note that the second highest percentage was in Kirkoswald where there was no barley in the 1830s.

Buteshire

Barley was grown in Bute and Arran in 1794, and in the former it paid half the rent, while in the latter it was exported to Greenock,

DIAGRAM **4:12**

FIARS BARLEY/BERE AYR



Saltcoats, Irvine, Ayr and Campbeltown.[49] The fact that barley paid half the rent in Bute was reiterated in the O.S.A. of Kingarth. The grain was sold to distillers on the island.[50] Barley was grown in both Kilbride and Kilmorie in Arran and in the latter the fact that it was exported to Greenock, Saltcoats, Irvine, Ayr and Campbeltown was repeated.[51] In Campbeltown three distilleries had been established recently. Nevertheless, only 190 bolls of barley were sown compared with 1320 of oats.[52] In all these cases it is likely that the type of barley sown was bere, and this is the word used by Headrick in his view of Arran.[53] Likewise, in 1813 Aiton states that bere was a common crop while barley was sown only occasionally on good land.[54]

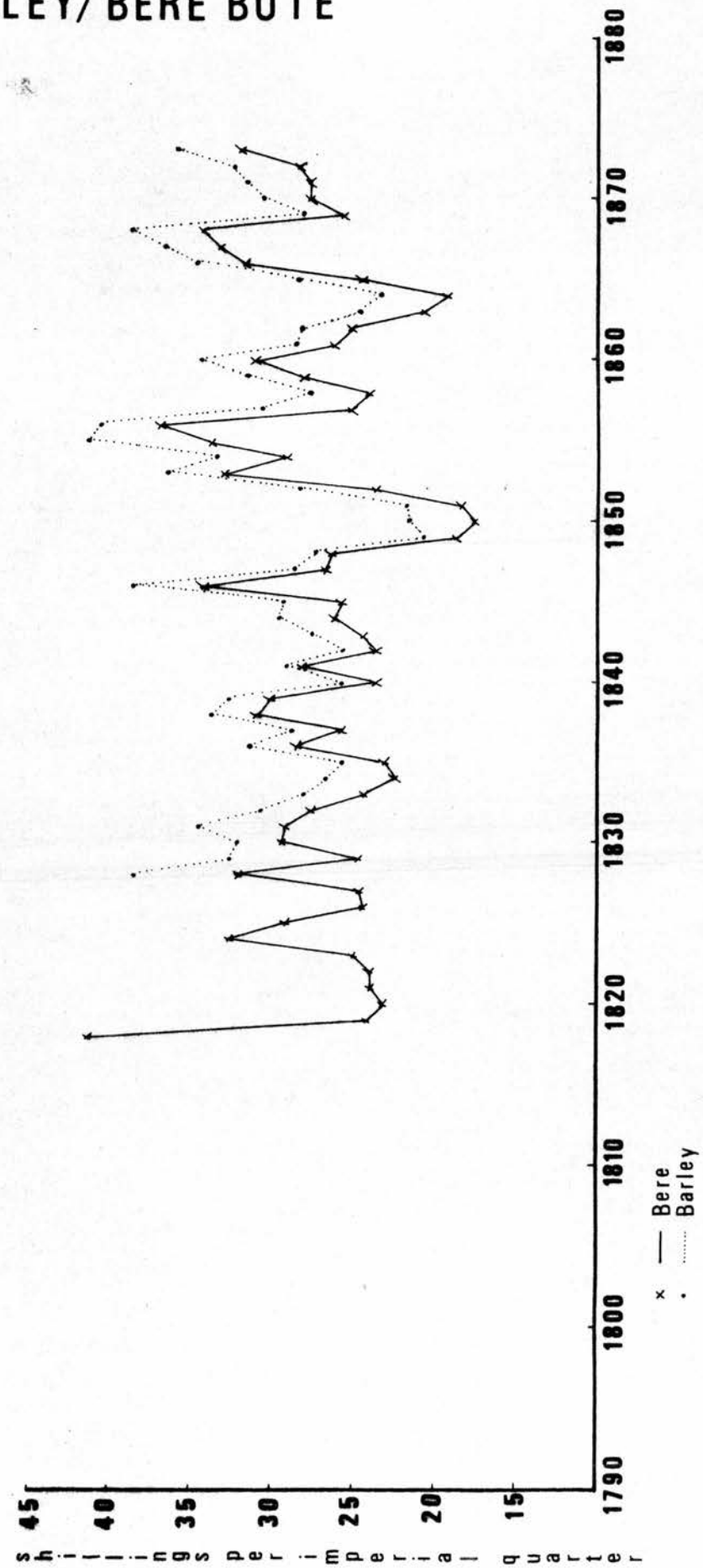
In the 1830s barley was grown in all parishes in the county, and was included in improved rotations introduced during the past twenty years. In Kilbride barley produced 947 quarters per annum compared with 2727 quarters of oats and in Kilmorie, there was some bere and true barley.[55] In Kingarth there were 140 acres of barley compared with 610 of oats.[56] By 1854 there were 448¾ acres of barley and bere in the county, and as in most other counties the figure fell in 1855 and 1856 and rose in 1857 (see table 4:10 and diagram 4:13).[57] As elsewhere, the total had fallen by 1866, and fluctuated for the remainder of the period without changing markedly.[58] In 1870 the highest percentage of land occupied by barley or bere was 2.11% in Kingarth, followed by 1.75% in North Bute (see map 4:4).[59] In only Kilmory was the percentage for barley higher than that for wheat.

Dunbartonshire

In 1794 barley was seen to be a precarious crop, although Blandard barley (a mixture of barley and bere) was sown from May onwards.[60] The advantage being that, as the crop ripened at different

DIAGRAM **4:13**

FIARS BARLEY/BERE BUTE



rates, part of it at least would be ready for reaping whether or not there was much sunshine. In the O.S.A. barley was mentioned almost everywhere as a major crop.[61] In Rhu bere was sown from 10th May to 8th June and reaped in September and October.[62] In Luss an 8-fold return was obtained, which was good by Argyllshire standards.[63] By 1811 the 'previously considerable growth' of barley had been superceded by wheat or potato oats because of the high malt duties, the the suspension of distilling and the increased demand for wheat.[64] In 1809 very little barley had been raised, although the crop was well-suited to light soils.[65] If sown after oats, 30 carts of dung per acre had to be laid down with the barley, but if it superceded potatoes or turnips no dung was necessary.[66] Bere was the commonest type and Blandard barley had been virtually abandoned because the bere and barley ripened at different rates.[67] The average produce was 7 bolls per acre, but 10-11 could be obtained on the best soils. Until it was prohibited, barley had gone into distilling, and afterwards the small quantities went to the breweries of Greenock and Paisley.[69] It had been used to prepare land for grass, but because its price had fallen, barley had been replaced by wheat and potatoes.[70]

By the 1830s barley was once more an important crop, and was listed in almost every parish where crops were mentioned.[71] In New Kilpatrick, however, there were only 315 acres of barley to 2488 of wheat and 5675 of oats, and in Old Kilpatrick 165 acres of barley to 985 of oats and 822 of wheat.[72] Barley seems therefore to have been of relatively minor importance. In 1854 there were 1432½ acres of barley, and as in other counties the total fell in 1855 and 1856, rising again in 1857.[73] Unlike Argyllshire and Ayrshire, the total had fallen drastically by 1866, only to fall again in 1867 and 1868 (see table 4:10 and diagram 4:14).[74] In 1870 barley was not grown

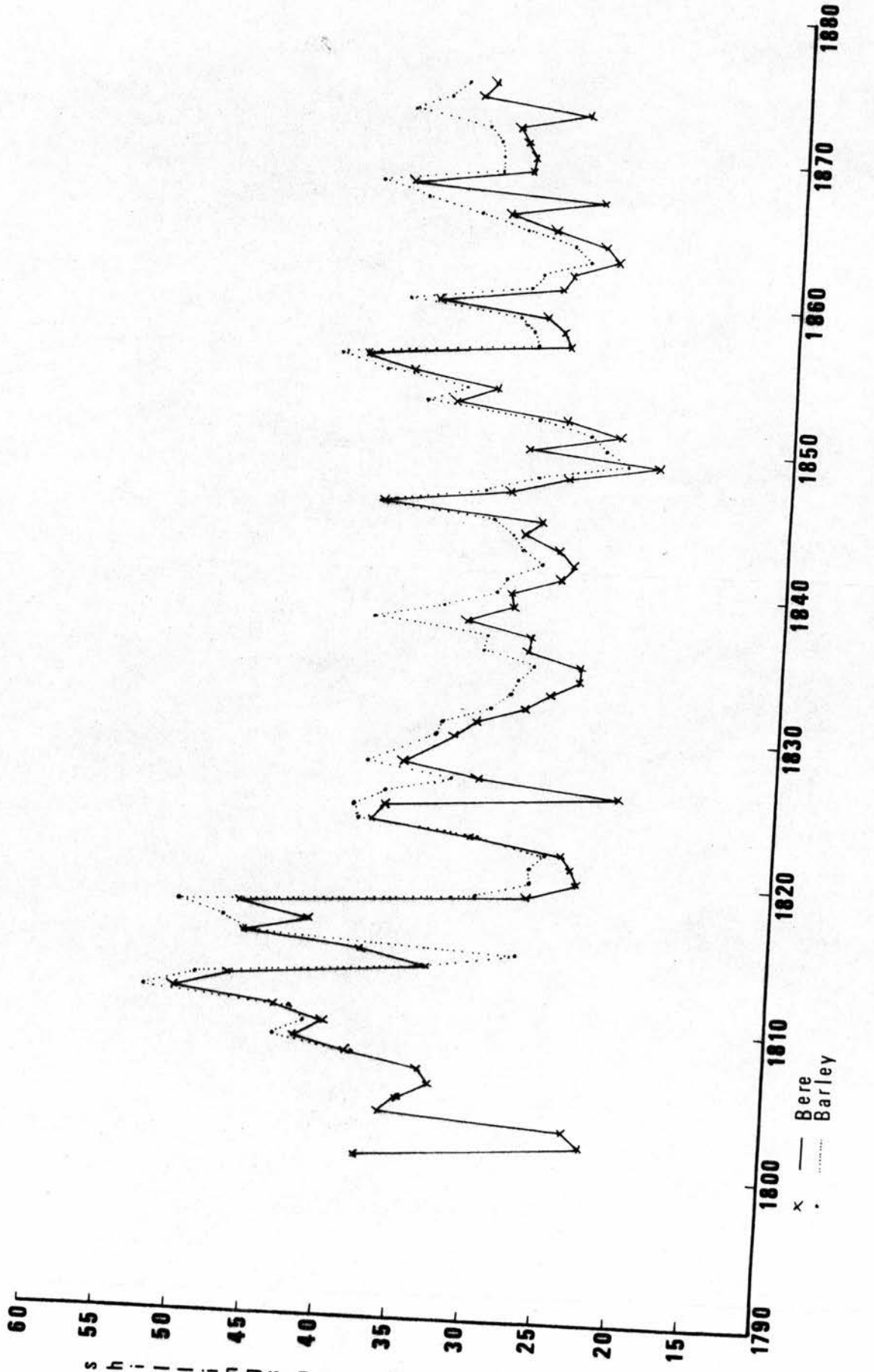
in Luss and Arrochar, and in every other parish it occupied a very low percentage of the land (see map 4:4).[75] The highest was 2.78% in Old Kilpatrick. It is clear therefore that the crop was an insignificant one, grown on a small scale over a wide area, probably for home consumption.

Lanarkshire c1790-c1830

Barley was grown in Lanarkshire in the 1790s, but from the perfunctory treatment which it receives in the agricultural reports it would seem to have been a minor crop.[76] In the O.S.A. barley is frequently mentioned, but in few parishes was it an important crop.[77] In Blantyre it was grown only in small amounts, but in Carnwath it was used after turnips.[78] In many parishes barley culture had declined if not completely ceased. In Shotts the bere crop had lately diminished because on the stiff soils it needed so much dung that the outfield had to go short.[79] In Bothwell barley culture had declined and the dung was used for wheat instead.[80] Although Lesmahagow barley was thin-hulked, plump and of good quality, its growth had declined after a series of poor seasons and a lessening of interest in the crop.[81] In Cambuslang wheat had taken over from barley, and in Hamilton cold summers had discouraged its growth, especially on clays, and wheat had increased in importance as barley had declined.[82] In Dalserf too wheat and oats were the chief crops, but barley had once been grown extensively until wet springs and cold summers had weakened its importance and wheat had superceded it, and taken the dung formerly used on the barley.[83] It is clear then that on the heavy clays of Lanarkshire, barley had declined before the restrictions on distilling came into force. These soils were less well suited to barley than to wheat and when the latter was in demand

DIAGRAM 4:14

FIARS BERE/BARLEY DUNBARTON



it superceded barley. The dung which had formerly been lavished on the barley was now used on the lucrative and environmentally suitable wheat.

c1830-1873

This pattern appears to have survived into the 1830s for there are many parishes in the N.S.A. where barley was not listed among the crops grown.[84] In many parishes where altitude was an important determinant, barley was grown and in most of them wheat was of less importance.[85] On the fluvio-glacial sands and gravels around Carstairs, barley was a more suitable crop than wheat. In Cambuslang barley had decreased from 200 acres in 1791 to only 15 in 1836.[86] In Cadder, 103 acres of barley were grown as compared with 1900 of oats, in Biggar the figures were 147 acres of barley and 1018 of oats, and in Carmichael 53 acres of barley and 904 of oats.[87] In Hamilton barley was sown only in small quantities to clean and prepare the land for artificial grasses. It had been grown extensively until the end of the eighteenth century, but cold summers had "banished it from this quarter of the country".[88] This summarises the fate of barley on heavy clay land in Lanarkshire, which does not seem to have been revised later. Only in situations unsuited to wheat did barley retain its importance, but it might have been grown occasionally elsewhere.

Nevertheless in 1854 there were 2542¾ acres of barley in the county, and this only fell slightly in 1855 and more substantially in 1856, but rose in 1857.[89] By 1866 this had fallen markedly to 911 acres and fell again to 1868.[90] It rose to 1146 acres in 1870, and fluctuated thereafter, but by 1874 stood at only 685 acres (see table 4:10).[91] In 1870 barley was grown in every parish in the county, but mostly in very small amounts. (see map 4:4).[92] The highest total was 3.98% of

the improved land in Bothwell, and 2.20% in Blantyre. It is not possible to infer whether when the total county acreage declined, parish acreages were even more markedly reduced, or whether some parishes abandoned the crop altogether.

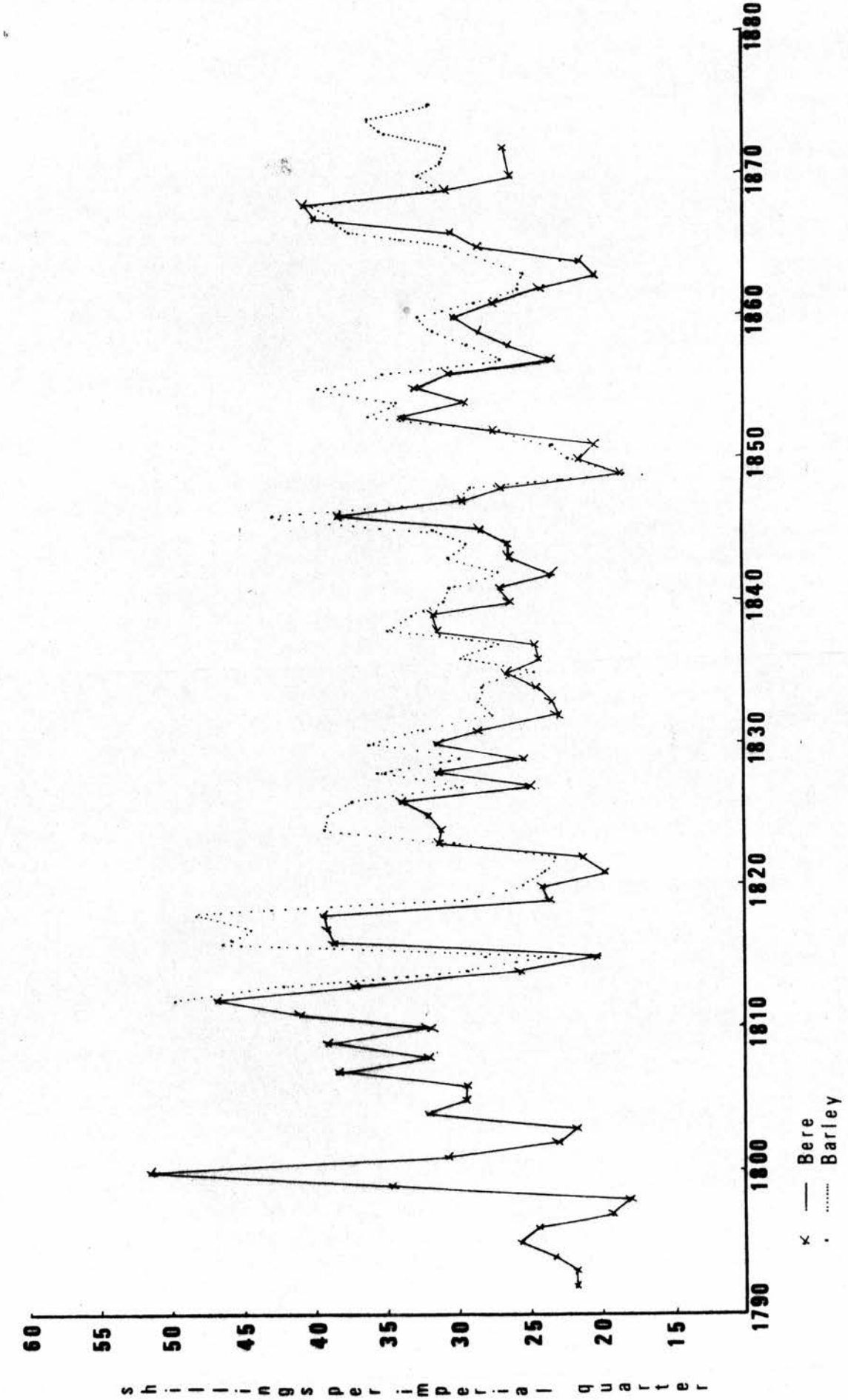
Renfrewshire

In 1794 barley was grown in several areas of the county. It was found in the rotations of Inchinnan on Spiers of Elderslie's lands, on the estate of Craigends and in the parishes of Eastwood, Paisley Abbey and Mearns, and may have been raised in other parishes too.[93] Barley was mentioned in most of the parishes of the O.S.A.[94] In Houston it was grown on highland and lowland farms.[95] In Lochwinnoch, Inverkip and Kilmalcolm only small quantities were grown.[96] In Kilbarchan, and Paisley Abbey barley was laid down with grass seed, and in Paisley Abbey, dung was applied to the crop.[97] In Renfrew barley was a major crop, and in Erskine all the bere raised was sold in the towns.[98]

In 1812 bere was one of the chief grains and some true barley was grown.[99] In the N.S.A. however, barley was not often mentioned, and it would seem to have been only a minor crop. It occurred in the rotations of Erskine, Mearns and Paisley.[100] By 1854 there were 477¼ acres of barley, and this rose slightly in 1855, fell in 1856 and rose again in 1857 (see table 4:10).[101] The figure had fallen to 234 acres in 1866 and fell again in 1867, reaching 140 in 1869, but rose to 250 in 1870 then fluctuated until the end of the period.[102] In 1870 barley was grown in small amounts in every parish except Port Glasgow, the highest percentage of improved land occupied was 1.50% in Inchinnan (see map 4:4).[103] Again it is difficult to know whether acreages fell

DIAGRAM **4:15**

FIARS BERE/BARLEY LANARK



when there was a general decline, or whether some parishes gave up the crop altogether. Probably the former was true, and the crop was grown in small amounts primarily for home use.

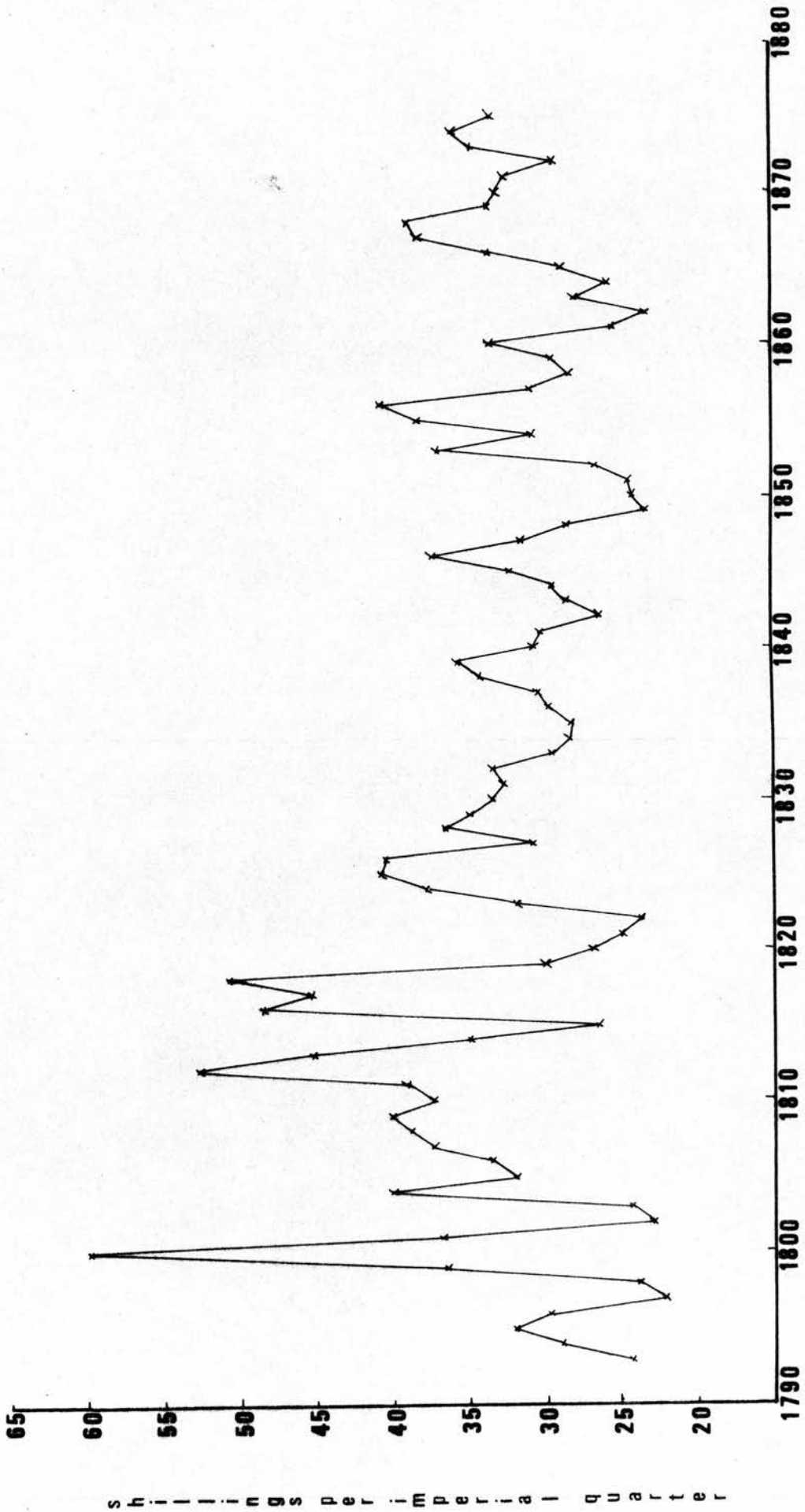
Stirlingshire

In the Carses in 1796 much barley was grown and was of excellent quality.[104] It was also raised on the Muir and Dryfield, but was of inferior quality.[105] Barley was mentioned in nearly every parish in the O.S.A.[106] In Fintry the old infield-outfield system persisted, and bere was grown on as much of the infield as could be dunged.[107] It was common knowledge that barley did well only on ground which had been well-dunged. In Strathblane this restricted the amount of the crop which could be grown.[108] In Kilsyth c100 acres of barley were planted in late April or May, and in Baldernock planting was in May.[109] In Buchanan barley was a major crop, but there were five stills to consume the produce.[110] In Airth too the barley was sold to local distillers and brewers. It accounted for c$\frac{1}{3}$ of the arable, but was an expensive crop in terms of manure and labour.[111]

In 1812 barley was still a major crop, although the number of distilleries had been greatly reduced since the introduction of restrictions.[112] The ground was ploughed at least three times, then manured. The seed was sown broadcast with clover and ryegrass and was rolled-in.[113] Barley was almost always mixed with bere, and in the high parts bere alone was sown.[114] The crop was popular, but its growth had declined in favour of the more profitable wheat, especially on the heavy clays of the carses.[115] In the 1830s barley continued to be a major crop, being grown in most parishes, but sometimes only in small quantities. For example, in Baldernock there were 45 acres of barley compared with 584 of oats and 183 of wheat, in Buchanan 90 acres

DIAGRAM 4:16

FIARS BARLEY/BERE RENFREW



of barley, but 400 of oats, in Killearn 360 acres of barley and 1500 of oats, and in Strathblane 140 acres of barley and 550 of oats.[116] In Polmont the crop was relatively more important covering 450 acres compared with 700 of oats.[117]

In 1854 barley occupied 7384½ acres although this fell in 1855, 1856 and 1857.[118] In 1866 the total stood at 4992 acres and fluctuated thereafter (see table 4:10 and diagram 4:11).[119] In 1870 there was only Buchanan in which no barley was grown, and unlike the other counties, the crop was a major one in many parishes (see map 4:4).[120] In Bothkennar it covered 17.59% of the land, and only in 8 parishes did it cover less than 1% of the land.

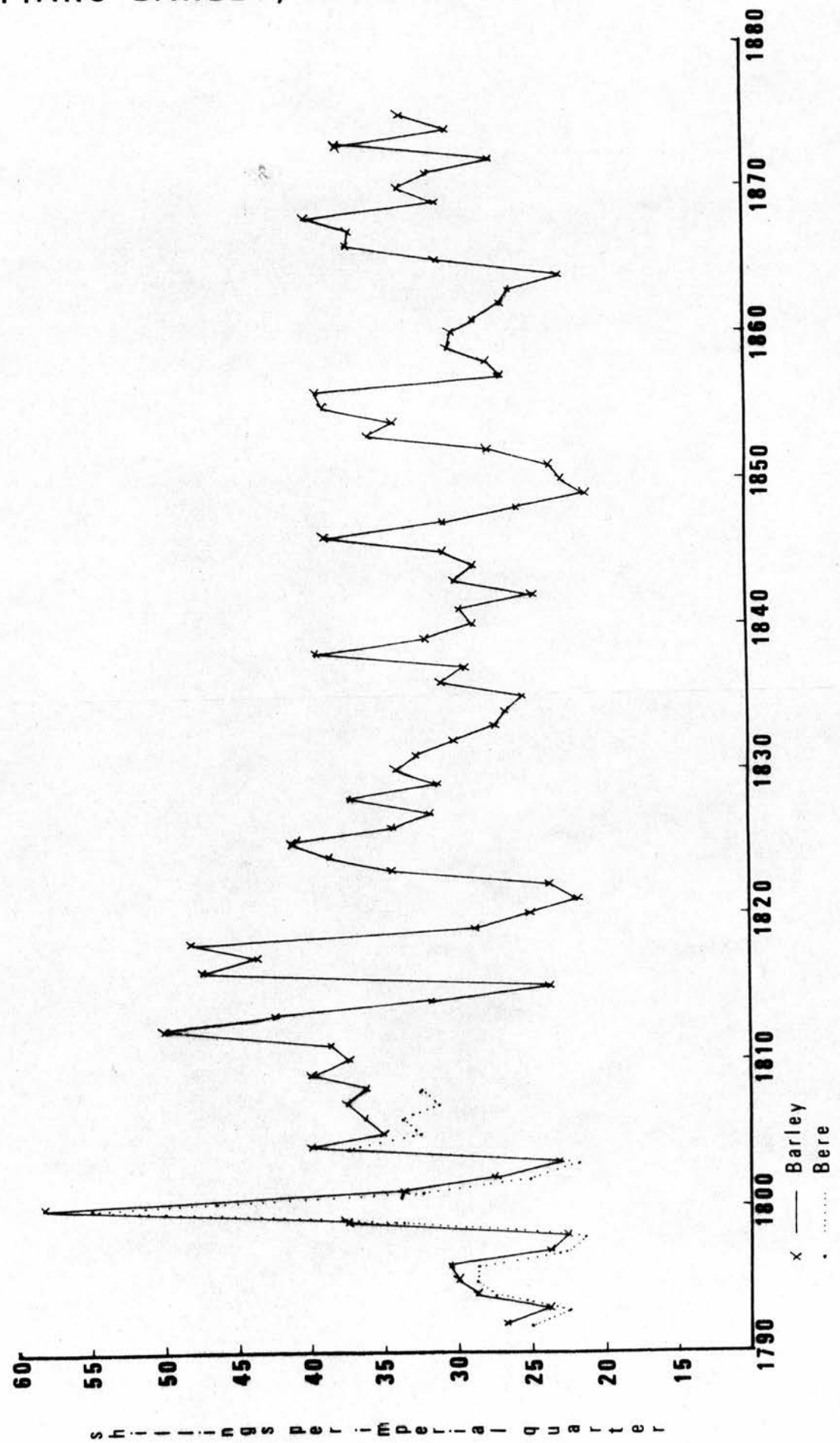
CONCLUSION

Barley was grown in most parishes during the period of study, although it was not a universal crop. It had been an important element in the traditional infield-outfield system, and was the basis of the important distilling industry. The role of barley changed with the transformation of the old farming system and with the restrictions on distilling made at the end of the eighteenth century. Nevertheless, barley retained its popularity and continued to be grown extensively, although it experienced competition from wheat, which could replace it in rotations, and was more lucrative. Barley was, however, an easier crop to grow, it was better suited to upland farms, and was useful as both a food and a drink crop.

Although barley was more widely grown than wheat, and indeed perhaps for this reason, there is less detail on its cultivation. In the 1790s the crop was very common, but in some areas it declined soon afterwards due to rising malt duties and to restrictions on distilling.

DIAGRAM 4:17

FIARS BARLEY/BERE STIRLING



Argyllshire does not stand out as an exception in barley culture as it did in wheat, chiefly because its inequality was less pronounced for this crop. In many cases barley covered less land than wheat by the 1850s (see tables 4:2 and 4:10).

In the Highland and Agricultural Society Census, barley and bere are listed separately. Only in Argyllshire did bere cover more land than true barley. The lowest figures for bere were found in Dunbartonshire and Stirlingshire, perhaps because the upland areas of these counties would have been unsuitable for arable farming, and wherever possible true barley would have been grown in lower areas. In Argyllshire, bere would have been more suitable even in many of the low areas. In Buteshire, Ayrshire, Renfrewshire and Lanarkshire it is likely that the bere acreages were found in high-lying areas which were used for arable farming. It is interesting that in Argyllshire, Dunbartonshire and Stirlingshire, the pattern of total acreages is completely opposite to that of wheat; there was a decrease in barley in 1855 and 1856, and an increase in 1857. There was a decrease in every county except Renfrewshire in 1855, and except Ayrshire in 1856 and an increase in every county in 1857. Fluctuations in acreage totals do not tie in with the barley fiars, nor do changes always correspond between counties (see diagrams 4:11 to 4:17). It is possible that its importance as a drink rather than as a food grain made barley less dependant on fluctuating prices.

By 1866 there had been a reduction in the barley acreage in every county. In Ayrshire this was a very small reduction, and by 1874 the 1857 total had been surpassed (see table 4:10). In Argyllshire, Buteshire and Stirlingshire the 1866 figure was about $\frac{2}{3}$ of that of 1857, in Renfrewshire about $\frac{1}{2}$ and in Lanarkshire and Dunbartonshire about $\frac{1}{3}$. In all six counties the 1874 figure was less than the 1857 one. It is

difficult to explain the Ayrshire case, although barley may have been used as food for the numerous dairy cattle in the county.[121] Indeed fatstock prices did increase during this period, and may have made it worthwhile to do this, especially as the value of dung would help offset the cost of fodder.[122] The acreage of turnips and swedes (possible alternative feed-stuffs) decreased, although the number of dairy cattle remained fairly constant.[123] The maintenance of a fairly high figure in Argyllshire can be explained in terms of distilling, and the best of the barley produced in other counties was probably also used in the distilling or brewing industries.[124] The inferior produce may have gone as fodder.

There is a clear overall trend towards declining barley acreages, and this ties in with the pattern for wheat. The reason for this was increasing foreign competition, and a swing away from grain farming in Britain. Another possibility that must not be overlooked is that yields per acre were increasing by use of more efficient methods and better seed, although this idea has not been tested. In the N.S.A. for Cambuslang it is, however, stated that barley yields had increased from 5 bolls per acre in 1791 to 7 bolls per acre in 1836.[125] This may have been an isolated or exaggerated incident, or may point to a wider and longer-term trend.

3. OATS

Oats were the most common and the most successful grain grown in Scotland throughout the period, and the one which best suited the country.[1] Indeed it was not until 1963, in Scotland that as a result of government subsidies, the oat acreage was less than that of barley.[2] Numerous varieties of oats were sown although they all belonged to the one species.[3] There were early and late ripeners, or hot-seed and cold-seed as they were sometimes known.[4] White oats could ripen early or late and included the Blainslie, Magbiehill, Bothrie, Halberton and Kildrummie types.[5] Blainslie oats were particularly popular for high altitudes, but potato oats had, in 1814, recently gained popularity.[6] They were particularly suitable for good, well-managed soils where they gave abundant returns of grain and straw.[7] Black oats were grown in the Hebrides and did well in cold exposed situations, although their return was too poor for them to be grown elsewhere.[8] Other varieties included common oats, Poland oats, Dutch oats, single oats, red oats and naked oats.[9]

Oats were sown on newly-broken ley after summer fallow, on soils not rich enough for wheat, or after pulse or turnips.[10] Winter-ploughing was essential for successful culture of oats especially on clay soils, for this opened the ground to frosts which would pulverise the soil.[11] Loamy soils also needed ploughing but the ridges were less steep, gravels however were ploughed in a circular fashion.[12] The seed was invariably broadcast because drilling was difficult on recently ploughed land.[13] Sowing was in March or April, as soon as the land was sufficiently dry.[14] The seed was sometimes steeped like barley to let it bud before planting.[15]

Generally, the unit price of oats was lower than that of wheat or

barley (see fiars), but because the crop was better suited to Scotland it could be more profitable.[16] Sinclair considered that it was for this reason that many farmers had given up barley for oats, and Kames makes it clear that much less work was needed to ensure a good crop of oats than of other grains.[17]

Argyllshire

In Lismore in 1794, apart from a little bere on the infield, oats were the only grain raised, and a similar system operated on the Breadalbane estates as well as elsewhere in the county where the traditional system prevailed.[18] Oats were common in Kintyre, and on the light loams of Campbeltown and Inveraray.[19] The crop was sown in April or May and harvested in September.[20] In the Hebrides oats provided bread for three-quarters of the population. In the more backward areas old Scots grey oats were sown, and although they did not shake in the wind, they produced a return of only three to one. Potato oats had been introduced but were unsuited to poor, light or high land.[21]

In the O.S.A. oats are mentioned in every parish for which cropping information is available, and were the major grain crop. In Kilbrandon and Kilchattan the best Blainsley and Coupar Grange oats had been introduced, of which the former type was reckoned to be superior.[22] In Glenorchy and Inishail Blainsley, early white and small grey oats were cultivated, and in Kilfinichan great and small oats were used although great oats had been introduced only 10 years previously.[23] In Tiree only small black oats were raised, as trials with white oats had failed, perhaps because of a lack of suitable drained enclosed land.[24] In Morvern too, small oats were general, and the great oats tried by the chief tacksmen had proved precarious.[25]

In Kilninian likewise small oats were the main sort.[26] Generally returns were not good, indeed in many parishes, they were little if any improvement on the traditional return of three to one (see table 4:9).[27] In Inverchoalain 'good' (unspecified) oat crops were obtained from land which had rested 2 or 3 years then been applied with seaweed.[28] In Glenorchy and Inishail the seed was frequently renewed from the high ground, and in Craignish new seed was imported from the lowlands.[29] Clearly some realisation of the importance of good quality seed and well-prepared land had dawned in the county.

In 1813 oats were still the commonest grain particularly in exhausted soils which could bear little else.[30] Small black oats were grown only in the mountains for feeding cattle in outlying areas, and on the poor soils of Mull's tiny arable plots.[31] Blainslie oats were most popular because they did well on most soils. The Polish type had been rejected because it was easily shaken.[32] In the 1830s oats still maintained their importance, being the chief crop in most parishes, and the chief grain in almost all. In Gigha some of the arable was cropped without intermission and in Inverchoalain it was usual to take four white crops in succession.[33] In 1854 there were 24,252½ acres of oats in Argyllshire, and this figure fell a little in 1855, but rose again in 1856 and in 1857 had almost reached the 1854 level.[34] The acreage fell to 19,537 by 1866, and fluctuated round the 20,000 acres mark for the rest of the period (see table 4:18).[35] In 1870 oats were grown in every parish, and in some cases accounted for more than 25% of the cropped land (see map 4:5).[36] In Ardnamurchan the figure was 30.70%, in fertile Lismore 29.37% and in Appin 28.90%. The lowest percentage was in Coll (9.41%) where most of the land was occupied by permanent grass.

Ayrshire

In 1793 oats were the 'staple provision', and their quality was good.[37] The crop was found to do best after ley.[38] Blainsley oats were most suitable, for they were not as easily shaken as Polish or Dutch ones, although they did ripen later.[39] Oats were always mentioned among crops in the O.S.A., and were generally the major crop.[40] In Craigie and Dunlop they were the chief grain, and in Dalry were most depended on, being more hardy and more certain then bere, and always commanding a ready market. In Kirkmichael oats were the most profitable crop, and in Riccarton the soil was thought more favourable for oats than for bere.[41] In Stevenston oats occupied three-quarters of the ploughed land, and in Ballantrae and Kilmaurs they were virtually the only crop.[42] In the latter, early oats were popular and were given the rich land in which they thrived.[43] In Kirkoswald too oats were the chief crop, but not the early variety.[44] In Dailly there were 800 acres of oats compared with 90 of barley, in Symington 644 of oats and 190 of barley, bere and wheat.[45] In Colmonell oats yielded 3-4 returns on ordinary land (as in many Argyllshire parishes), but 6-9 returns on land rested then enriched with dung and lime.[46] On lands near the village of Straiton, oats yielded 6-7 to 1.[47]

In 1811 oats were still the principal grain, and were sown broadcast after ploughing, then harrowed in.[48] Good quality grain was raised on the Ayrshire clays which produced excellent meal.[49] In the 1830s oats remained very popular, for example in Craigie they occupied 1426 acres compared with 13 of wheat and 6 of barley.[50] In Dalrymple oats were sown on all soils, but did best on clays and loams.[51] Common, potato, red, grey, early and late Angus oats were all grown.[52] In Tarbolton oats were as profitable as wheat.[53]

MAP 4:5

OATS AS PERCENTAGE IMPROVED LAND 1870

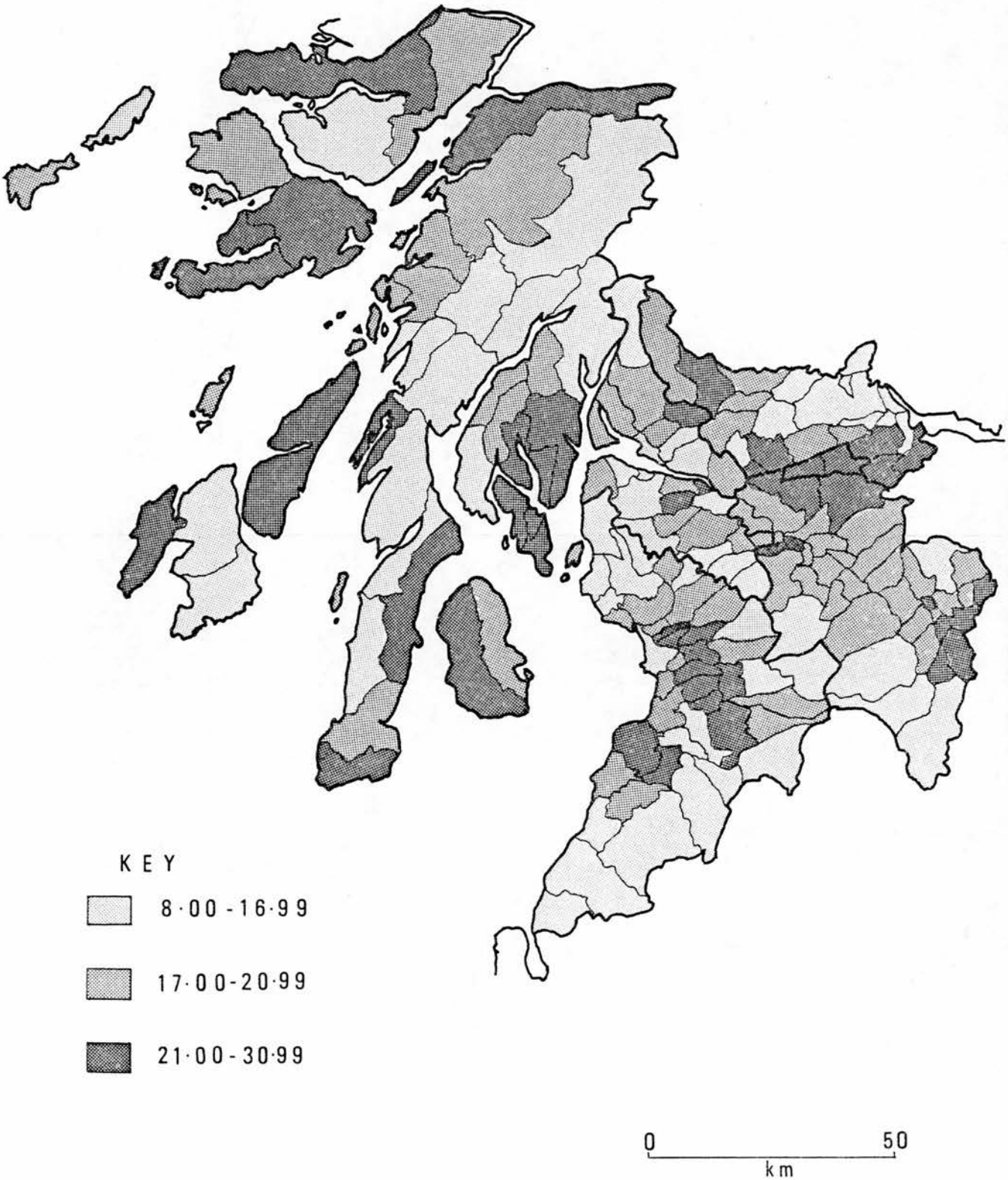


Table 4:18

OAT ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	24252½	63445¼	4503	9169	56116¾	16357	22028¼
1855	22872½	61648¼	4342	9904¼	54738	16392	22378¾
1856	23213	60740¾	4081	10073½	54803¾	16504	22654
1857	24001	62818¾	4473½	10027¼	57041½	17097¾	23133
1866	19537	50948	4931	8564	44904	14229	20190
1867	19913	50617	4610	8537	44746	14339	19956
1868	20454	52518	4627	8319	46226	14454	19745
1869	20767	52414	4713	8079	47953	14072	19817
1870	20542	52095	4836	8352	47696	14088	19480
1871	20183	49947	4785	8438	46981	13653	18960
1872	20722	50005	4934	8304	47517	13900	19322
1873	20440	48323	4893	7948	46547	13920	18374
1874	20513	49081	4941	7871	45072	13645	18485

In 1854 there were 63,445¼ acres of oats in Ayrshire, and this fell in 1855 and 1856, but rose almost to the 1854 level in 1857. The total was only 50,948 in 1866 and fluctuated around this level for the remainder of the period (see table 4:18).[54] Sturrock estimated that oats occupied ½ - ⅔ of the land under tillage, and four times as much as wheat. He must have excluded sown pasture from his category of land under tillage if this estimate is correct, and the June Returns do not corroborate his observations in respect of wheat. The most popular variety of oats was the 'Tam Finley', and the seed was broadcast.[55] In 1870 oats were grown in every parish in Ayrshire (see map 4:5).[56] The highest percentages were 27.99 in Riccarton, 25.76 in Kirkmichael and 24.92 in Tarbolton, and the lowest 8.30 in Girvan and 8.79 in Barr. Parishes with low acreages of oats had high percentages of permanent grass.

Buteshire

In 1794 oats were the chief crop in Arran, and were grown extensively in Bute.[57] The O.S.A. for Kingarth indicates that oats and cattle together paid half of the rent, the remainder being covered by barley.[58] Oats were exported for sale in Largs. In Kilmorie oats are not mentioned as exports, but 1320 bolls were produced compared to 190 of barley which was sent to several Clyde ports.[59] In Kilbride oats are not mentioned at all, but crop yields on the best land are given as 2:1.[60] In Arran in 1807 a rather exhausting rotation was used, and the oat crop produced only 3-4 seeds to 1.[61] In 1816 oats were the most common grain and the returns in Arran are stated to be 3:1, although good crops could be had in Bute.[62] The latter was the more improved island.

By the 1830s improvements were taking place in Arran and the old

multiple-tenant farms were being broken up and better rotations used.[63] We may infer that yields increased although oats remained the major grain. In Kilbride the produce was 2727 quarters of oats compared with 947 of barley and 30 of wheat.[64] In Bute too oats were the major grain occupying 610 acres in Kingarth, against 140 of barley and 50 of wheat.[65] In 1854 there were 4503 acres of oats in the county, and this figure fell until 1856, only to rise again in 1857.[66] By 1866 the total had increased marginally, and Buteshire is the only county to show this trend.[67] Figures fluctuated for the remainder of the period (see table 4:18). In 1870 all parishes had a high percentage of improved land given over to oats, the lowest figure being 18.01 in Kilbride and the highest 27.24 in North Bute (see map 4:5).[68] This is probably because the county grew little other than oats and pasture crops. Figures for pasture may have been even higher had unimproved land also been taken into account.

Dunbartonshire

In 1794 oats were considered to be the surest crop.[69] The best seed came from the stiff clays of Baldernock, Kippen and Blantyre.[70] Blainslie oats had not succeeded well because of a lack of rich soil and of mild weather.[71] In the 1790s oats were grown in most parishes, usually as a major crop. In Rhu they were sown from March to May, and reaped in September or October.[72] In Luss 625 bolls of oats were sown compared with 47 of bere.[73]

In 1811 oats were still the chief grain, and virtually the only crop on land newly broken from pasture, and were often sown after potatoes, turnips or summer fallow when the season was unfavourable for wheat.[74] Until recently all land had been cropped with oats for as long as it would give a return of 3:1.[75] The grass was limed with 4-8

chalders per acre before sowing with oats in March-April.[76] In the 1830s oats retained their importance. In Kilmaronock inferior lands were cropped for two years with oats, then left four years in pasture.[77] In New Kilpatrick 5675 imperial quarters of oats were produced compared with 2488 of wheat and 315 of barley.[78] In Old Kilpatrick oats occupied 985 acres compared with 822 of wheat and 165 of barley.[79] In 1854 there were 9169 acres of oats and this increased in 1855 and 1856, only to fall slightly in 1857.[80] By 1866 the acreage had fallen to 8564 and continued to decline until 1869 when it reached 8079 acres.[81] It increased thereafter until 1871, but fell again in 1874 (see table 4:18).[82] Oats were raised in every parish in 1870 (see map 4:5).[83] The highest percentages were found in Kirkintilloch (25.63%) and Cumbernauld (23.50%), and the lowest in the upland parish of Arrochar (9.39%).

Lanarkshire

In 1794 oats were the main spring corn and covered $\frac{2}{3}$ - $\frac{3}{4}$ of the tilled land.[84] Many varieties, early and late, were used.[85] The seed was not steeped but it was rubbed with salt to protect against caterpillers.[86] In Cambuslang in the 1790s oats were still the main crop, but the acreage was diminishing; forty years previously they had been virtually the only grain sown.[87] In Lesmahagow the quality of the oats had diminished in the last 20 years, and the fact that more were raised to feed horses was blamed for this.[88] In Douglas oats were the only grain sown apart from a few acres of barley. Blainsley oats were the commonest sort, but early barley oats had been introduced although they were unlikely to succeed as the seed was found to shake too readily.[89] In East Kilbride oats produced the best crops, but even

so were precarious because of the lateness of seedtime and harvest.[91] In Dolphington barley oats had been found to do well on rich land.[92] In Cambusnethan many farmers grew two or three oat crops then lay the fields in grass.[93] Oats were the most common crop in Carmunnock, E. Monkland, Cambusnethan and Blantyre.[94] In Carmichael the Blainsley and moorland Ayr types were the most common. The very early kind were too easily damaged.[95] In Libberton there were 2123 acres under oats compared with 100 in barley, and in Walston 563 acres were sown with oats as against 63 in barley.[96]

By the 1830s oats were still of great importance, being mentioned in almost every parish. In Biggar 5599 bolls of oats were raised compared with 1323 of barley and 135 of wheat, in Cambuslang there were 7000 bolls compared with 3000 of wheat, while in Cadder there were 1900 acres of oats, 103 acres of barley and 510 of wheat.[97] In Pettinain and Douglas the high altitude restricted farmers to growing oats and barley, so these were the major crops.[98] In Hamilton oats were the principal spring corn, covering $\frac{2}{3}$ - $\frac{3}{4}$ of the tilled land.[99] Blainsley oats were well established although Polish, Essex and Friesland varieties had been tried, and potato oats were considered to be the best among the new types.[100] In Douglas, Blainsley and early Angus varieties were the favourites.[101]

In 1854 there were 56116$\frac{3}{4}$ acres of oats, and this fell in 1855, but rose again by 1857.[102] The figure had fallen to 44904 acres by 1866, and fluctuated thereafter (see table 4:18).[103] In 1870 oats were grown in every parish (see map 4:5). The highest percentages were 26.72 in Cadder, 26.31 in Culter and 25.41 in New Monkland, and the lowest was 10.01 in Douglas where permanent grass accounted for $\frac{2}{3}$ of the acreage.[104]

Renfrewshire

Here too oats were important. In 1794 they were frequently mentioned, and in the O.S.A. oats were the chief grain.[104] In Inchinnan, Kilmacolm, Innerkip and Lochwinnoch they were the most common crop, and were raised on both hill and lowland farms in Houston and Killallan.[105] Despite their importance, in Mearns insufficient oats were grown to supply the parish.[106] In 1812 oats and bere were the two chief grains in the county.[107] In Paisley by the 1830s there were 400 acres of oats in the upper division and 2750 in the lower, compared with 1980 acres of wheat all in the lower division.[108] By 1854 there were 16357 acres of oats in the county, and this rose gradually until 1857 but it had fallen by 1866, and fluctuated thereafter (see table 4:18).[109] As elsewhere oats were grown in every parish in 1870 (see map 4:5).[110] The highest percentage was 23.47 in Houston, and the lowest was 8.47 in Eaglesham, an upland parish where grass was most important.

Stirlingshire

Oats were important in Stirlingshire too, although in 1796 they were sown more seldom than formerly.[111] On the best lands only enough were sown to feed the horses and to grind into meal for family use.[112] The crop was, however, grown almost universally. In Fintry the infield-outfield system persisted and was being superceded slowly due to the example of Mr. Spiers of Culcruich.[113] In Kippen, Essex oats had been tried but were found to shake too readily in the wind.[114] In Strathblane 3402 bolls of oats were raised compared to 352 of barley.[115] In Kilsyth there were 1600 acres of oats, but only 100 of barley.[116] Oats were usually sown after grass, and were ploughed once at the start of

winter.[116] On light soils potato oats were sometimes sown without ploughing on potato and turnip land.[118] Several varieties were used, especially Blainslie, Coupargrange and potato oats, and the seed was sown broadcast in February-April.[119]

Oats retained their importance into the 1830s. In Baldernock there were 584 acres of oats compared with 183 of wheat and 45 of barley, in Buchanan 400 acres of oats and 90 of barley, and in Killearn 1500 acres of oats, 360 of barley and 60 of wheat.[120] By 1854 there were 2202¼ acres of oats in the county.[121] This rose until 1857, but by 1866 the total had fallen to 20190 acres and by the end of the period stood at only 18485 acres (see table 4:18).[122] In 1870 oats were found in every parish (see map 4:5).[123] In Muiravonside they covered 24.07% of the land and in Campsie 24.64%. The lowest percentage of oats was found in Stirling (10.99%).

CONCLUSION

Oats, then, were a universal crop, and were probably grown by every farmer who raised grain. This was due to their importance in the traditional Scottish farming system and diet, but this was based on their climatic suitability. It is unlikely that there was a parish at any point in the period in which no oats were grown. In some cases oats were the only grain raised, but in most areas other grains had a place in the rotations. In the 1850s and 1860s oat acreages were greatly in excess of other grains. A decline is noticeable in every county between the beginning and end of the period, but this is much less marked than in the case of other grains (see tables 4:2, 4:10, 4:18). The fall from 1857 to 1866 was also much less spectacular. The acreage fluctuated from year to year and county to county, but

there is little noticable pattern in this (see diagrams 4:19 - 4:25). Much of it may have been due to changes in the rotations, which may have obscured the general downward trend. Oats were the grain least susceptible to periodic fluctuations and the least influenced by foreign competition and changing national fortunes. This is chiefly because of the lower value of oats and the fact that foreign producers concentrated on the more valuable wheat. This meant that Scottish farmers suffered less from changing fortunes than did their Southern English counterparts who were depending on wheat as their major grain crop. The decline in the oat acreage may have been due to their declining importance in the human diet, the use of artificial food-stuffs for horses, improved yields, and the abandonment of marginal land which was not economic in a modern farming system.

When considering the percentage of improved land occupied by oats in 1870, (see map 4:5) it must be borne in mind that sown and rotation grasses occupied high percentages of land where oats covered relatively low ones. In relation to the grains, however, oats often had a large share of land, and this was perhaps most pronounced in those parishes which have low percentages of oats. Many of these areas were marginal for the production of any grain and concentrated more on pasture. On the other hand, low percentages of oats could reflect a highly favoured situation in which large areas of land were devoted to barley, wheat and other lucrative crops. For this reason map 4:5 must be studied in conjunction with the other maps showing cropping patterns.

DIAGRAM 4:19

FIARS OATS ARGYLL

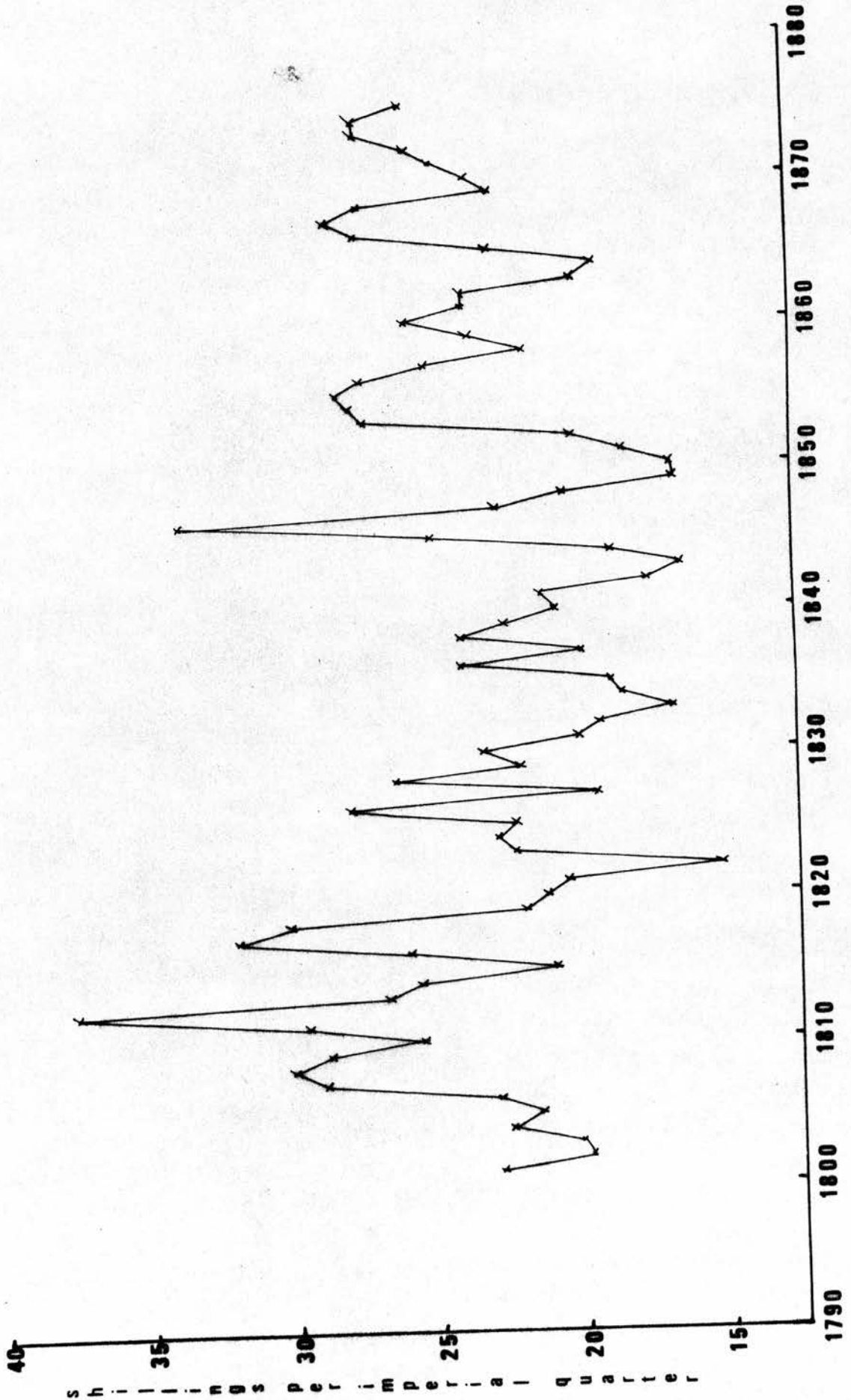


DIAGRAM **4:20**

FIARS OATS AYR

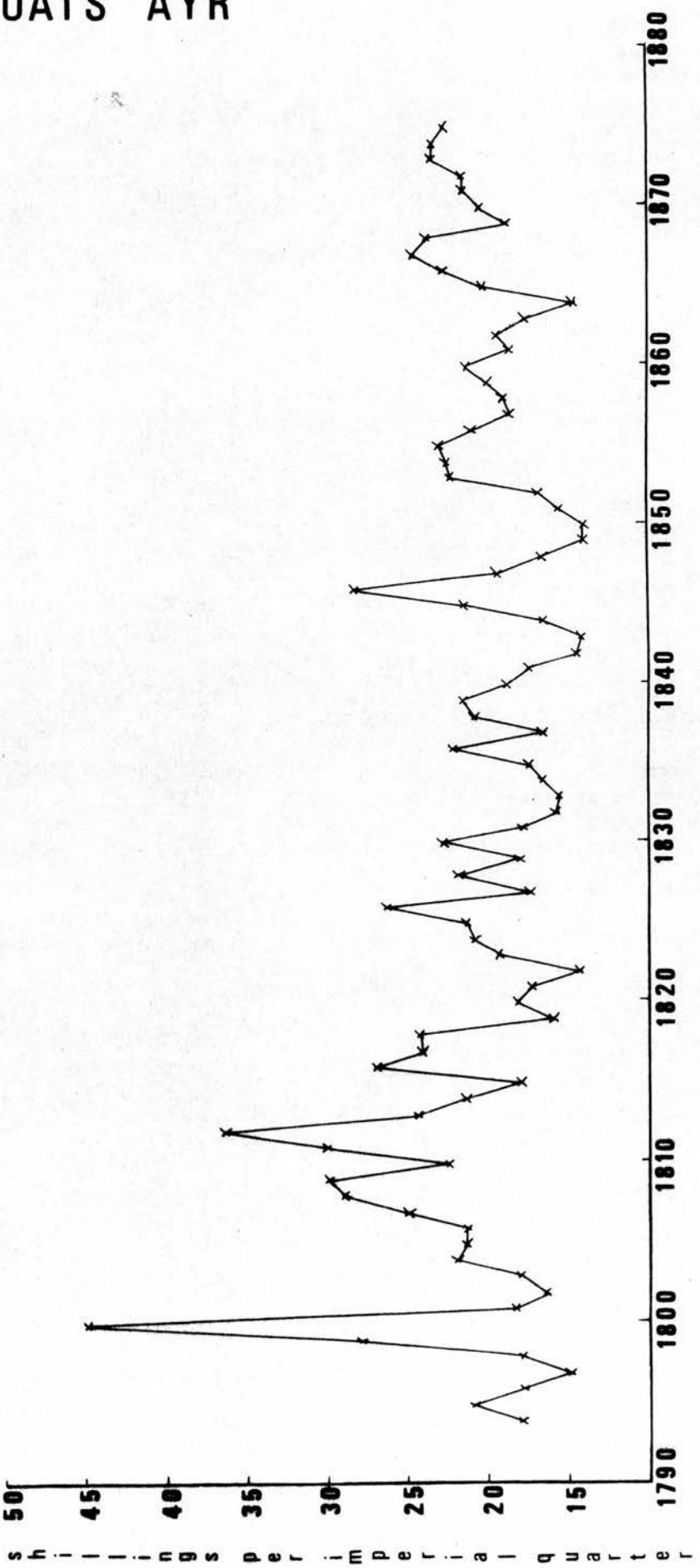


DIAGRAM **4:21**

FIARS OATS BUTE

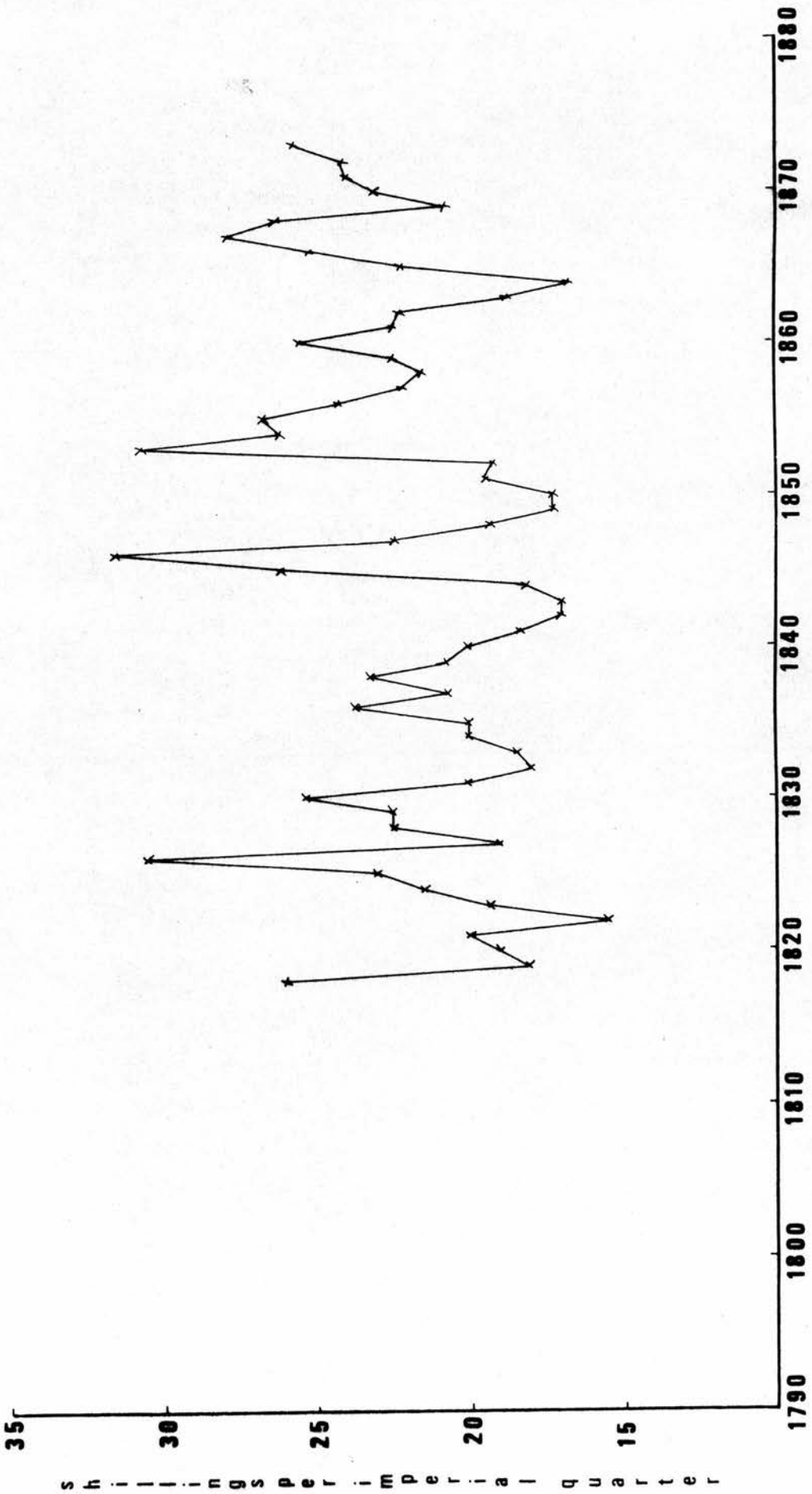


DIAGRAM 4:22

FIARS OATS DUNBARTON

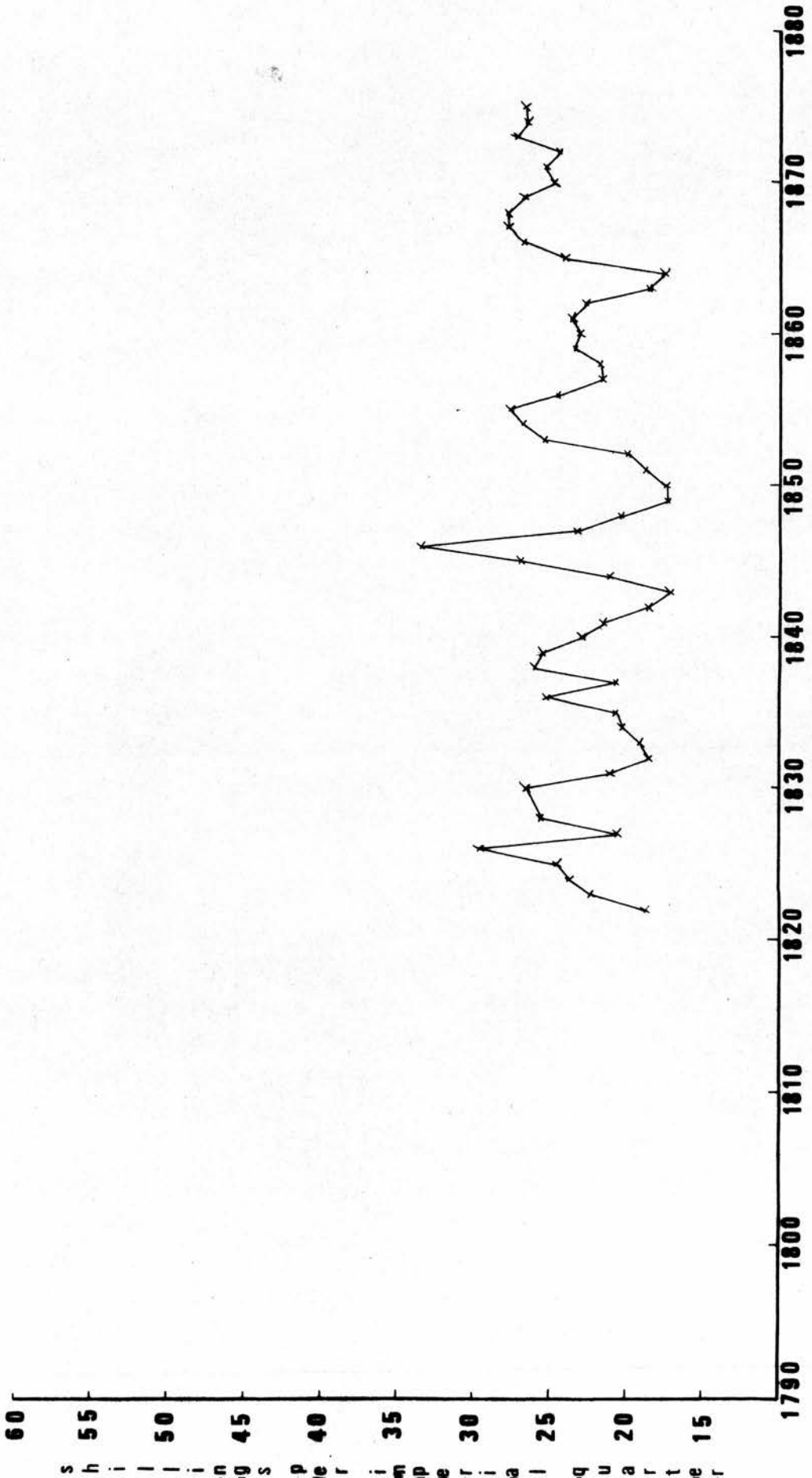


DIAGRAM 4:23

FIARS OATS LANARK

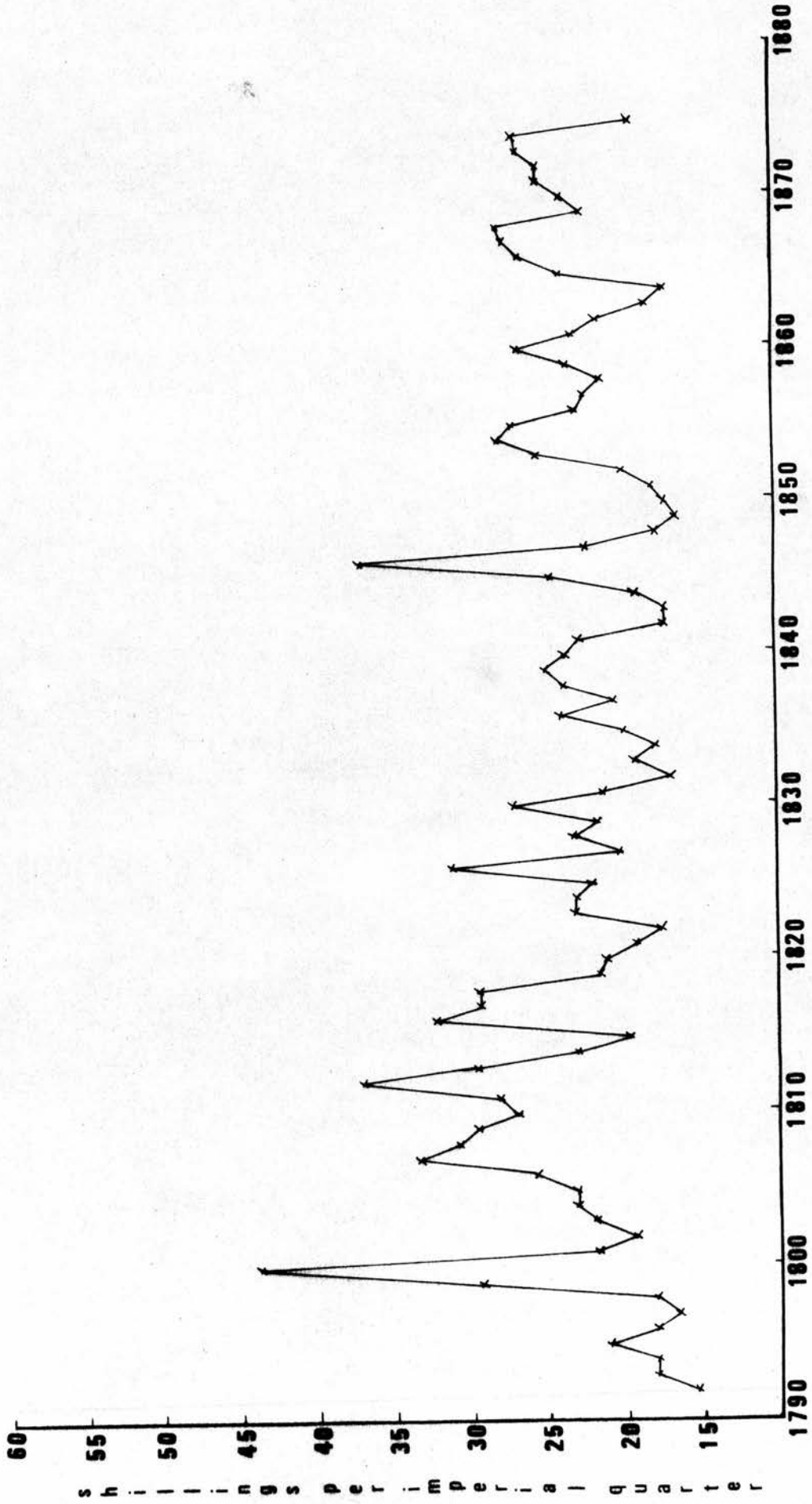


DIAGRAM 4:24

FIARS OATS RENFREW

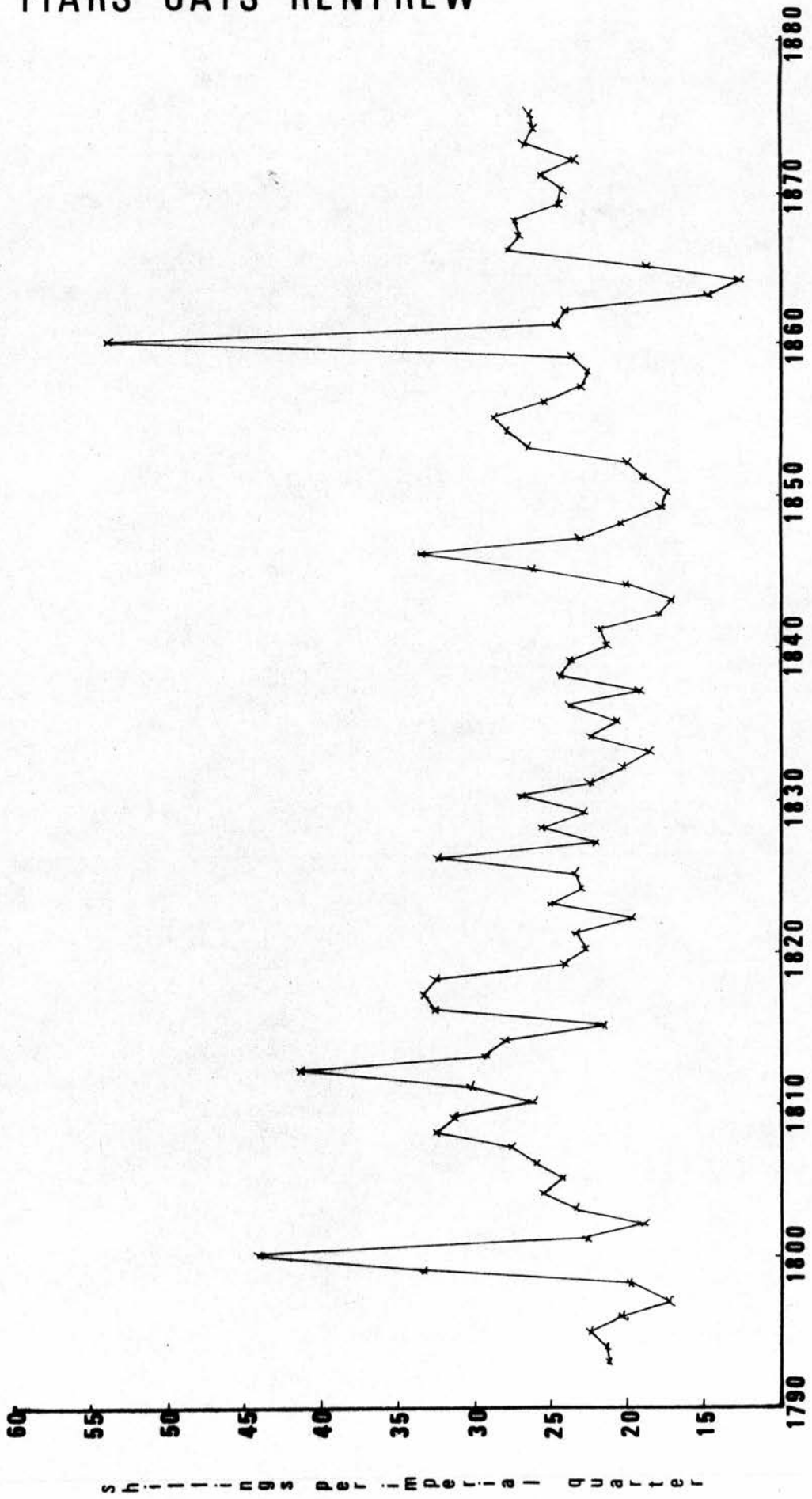
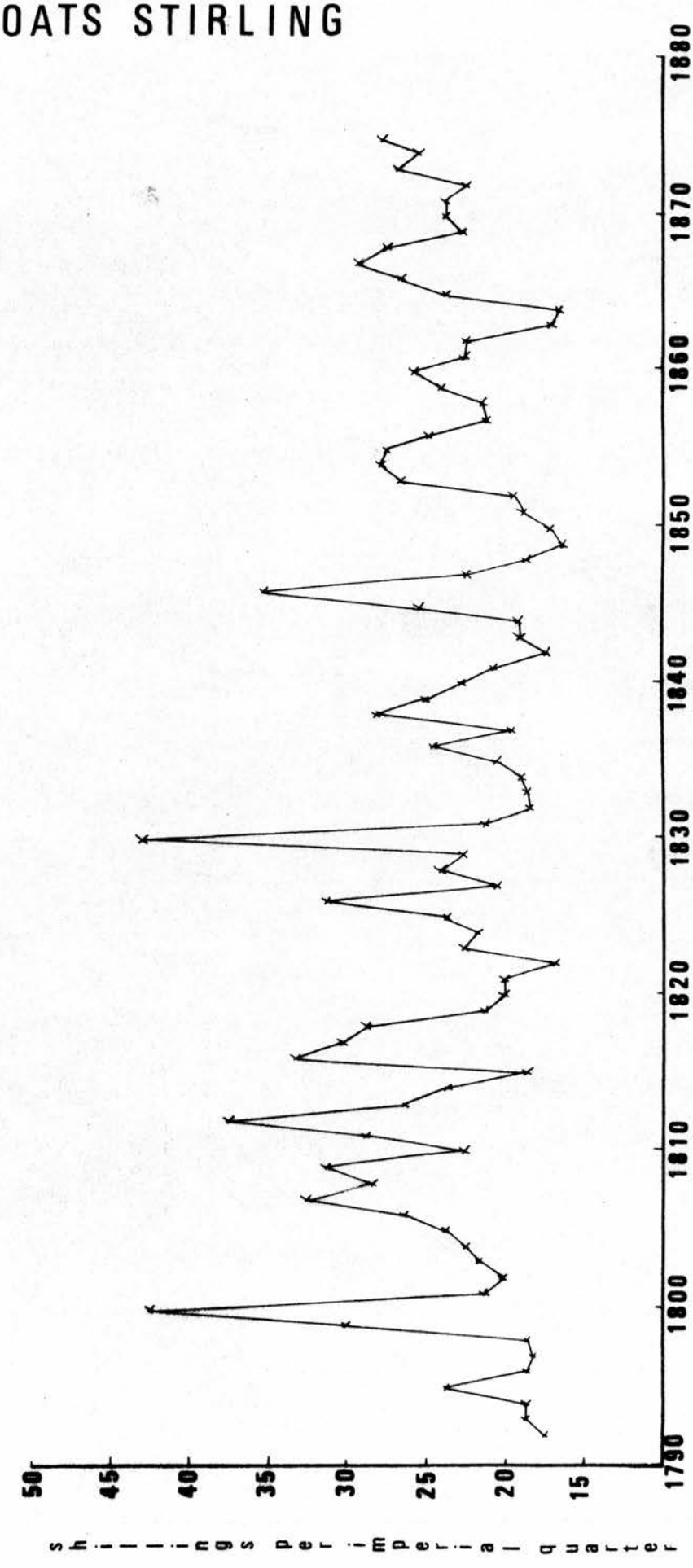


DIAGRAM 4:25

FIARS OATS STIRLING



4. RYE

Rye was never a major crop in Scotland, and was rarely cultivated in improved district, since it required the same sandy, acid soils as did turnip husbandry, although it could follow turnips.[1] Sinclair, however, considered that it should be grown more extensively.[2] Rye needed a porous soil, and had to be sown early.[3] There was only one variety, Secale cereale.[4] The seed was not steeped, but like wheat could be sown in autumn, winter or spring.[5] On moorland rye was a more certain crop than oats.[6]

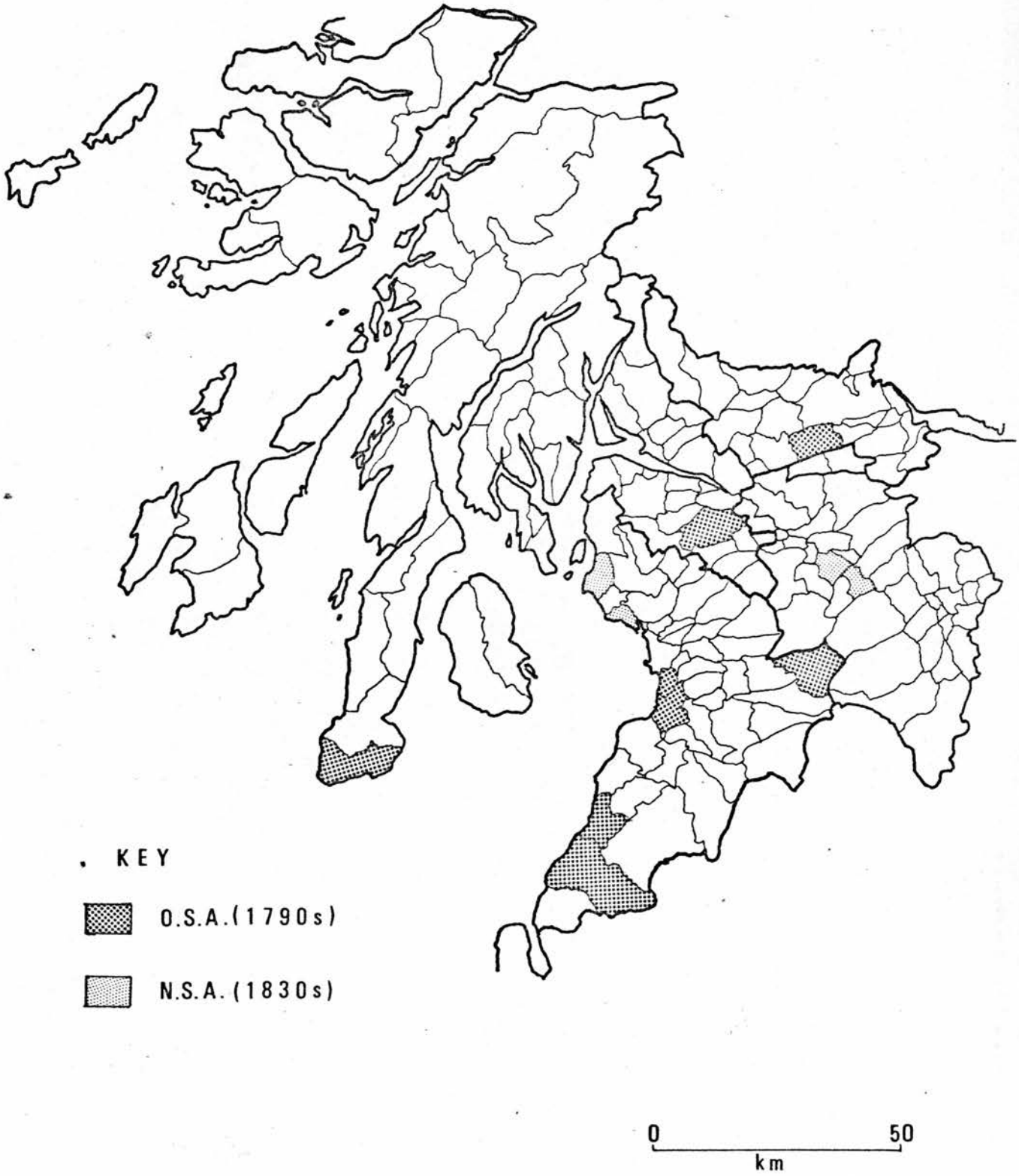
Argyllshire

In the 1790s small amounts of rye were sown on the light sands of the Kintyre coast, but not elsewhere in mainland Argyllshire.[7] It had long been sown on the sandy soils of the Hebrides with seaweed as manure.[8] It would grow on exhausted land where no other grain could be raised, but even so often failed.[9] In this way rye frequently dealt exhausted land its death blow, and may partly explain why rye was thought to be an exhausting crop.[10] Rye was not mentioned in any Argyllshire parish in either the O.S.A. or the N.S.A. except Southend in the O.S.A. where there was a little rye (see map 4:16).[11] It was probably grown in more parishes, but not to a degree considered worthy of mention. This is surprising because in 1854 there were 551¾ acres of rye, about twice the acreage of wheat, so it must have had some importance.[12] The lack of evidence may be due to its being an unpopular crop, grown on the poorest land unsuitable for other grains. Wheat, on the other hand, was a highly lucrative and fashionable crop, and for this reason may have seemed more important.

The rye acreage fluctuated considerably after 1854 (see table

MAP 4:6

RYE GROWING - SOURCE O.S.A. & N.S.A.



4:26). The pattern is rather puzzling, for it follows no recognisable trend. In 1870 rye was grown in all but ten of the Argyllshire parishes (see map 4:7).[13] It was generally raised in small amounts, but in Tiree it accounted for 5.38% of the land. Here there was much blown sand which frequently inundated farms on the north-west and west coast. In Inverchaolan rye covered 2.75% of the land, in Ardnamurchan 2.06%, Appin 1.38% and Kilfinichen and Kilviceuen 1.23%. There are immature sandy soils in all these parishes, particularly along the coasts, which would have been well-suited to rye.

Ayrshire

In Ayrshire rye was seldom sown except on sandy shores where it yielded well.[14] In the 1790s rye did warrant a mention (see map 4:6). There was definitely none in Ochiltree, but in Newton-Upon-Ayr, where the soil was "mostly sand", rye could sometimes be grown to advantage, although it impoverished the soil since insufficient seaware was thrown up to use on it.[15] Small amounts of rye were grown in Girvan, but were profitable only if the soil was light and sandy.[16] In Monkton and Prestwick rye was grown near the village, possibly on sandy soils.[17] In Muirkirk rye was sometimes sown, perhaps on infertile moorland.[18] This was certainly the case in Colmonell, rye was grown in the hills and succeeded better than other crops.[19] In the 1830s rye was mentioned only in W. Kilbride and Stevenston, but it may well have been grown elsewhere too.[20]

During the 1850s, the acreage of rye was steadily increasing[21] (the only county where this happened - see table). It is possible that this represents a more efficient system of farming which increasingly utilized the poor lands. The fact that the rye acreages had

Table 4:26

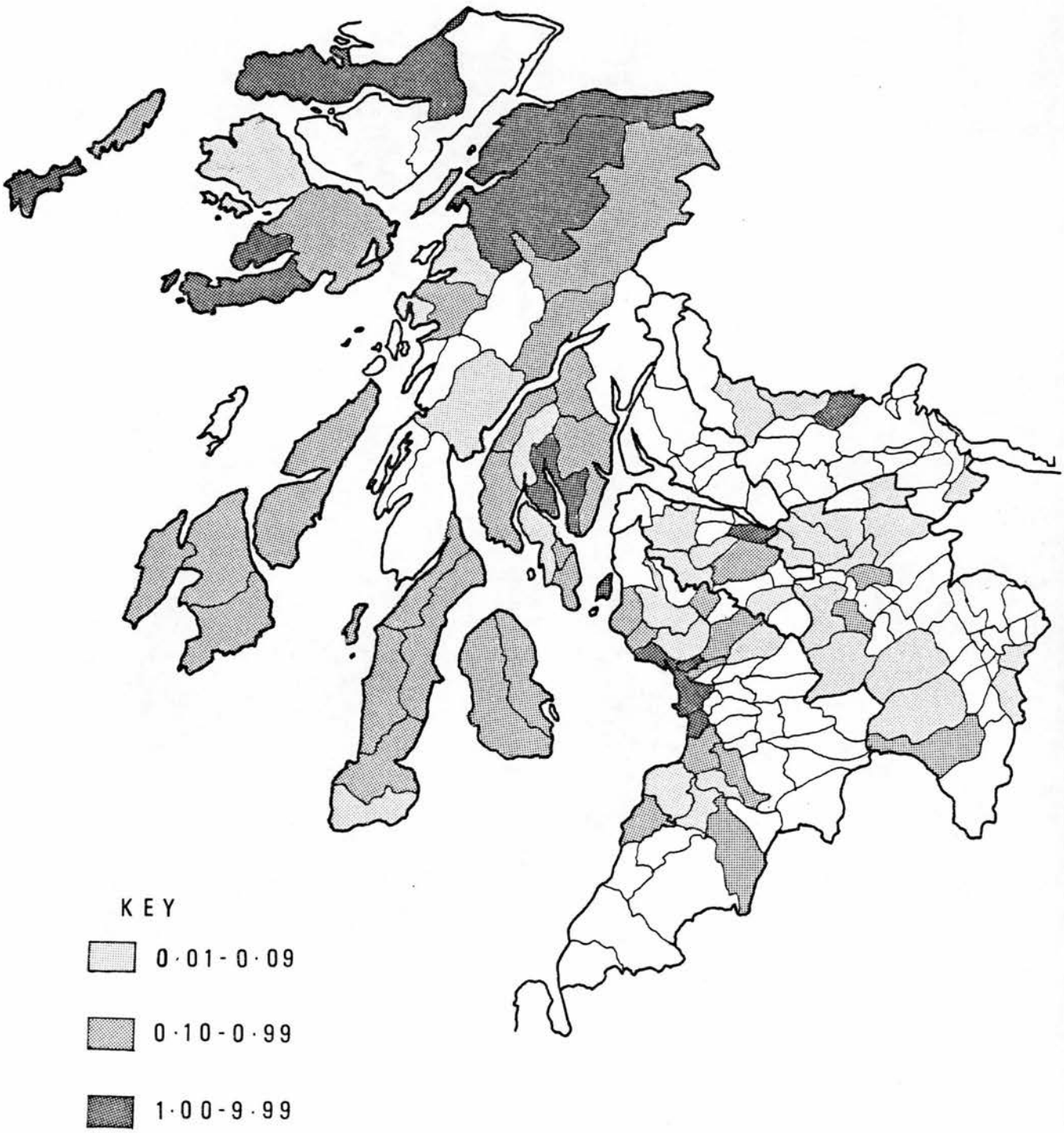
RYE ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	551¾	356¾	71¼	59¾	164	37¼	101
1855	374¾	361½	35¾	28	68	12	25½
1856	345	535½	27	-	56¼	8	33½
1857	371¾	649¾	56	1¼	103¼	74	18½
1866	557	326	72	-	99	42	3
1867	653	312	66	15	66	12	5
1868	440	368	51	17	56	30	60
1869	527	514	51	1	158	8	78
1870	526	576	70	1	71	38	38
1871	642	526	41	8	69	59	35
1872	478	391	36	-	21	22	86
1873	568	490	35	58	30	26	25
1874	428	284	80	22	18	4	35

MAP 4:7

RYE AS PERCENTAGE IMPROVED LAND 1870



fallen from 1857 to 1866 and fluctuated thereafter, may point to the over-cropping of these lands with rye (see table 4:26). In 1866 the 600 acres of rye found in the county lay on the sandy soils of the coast.[22] Within living memory these lands had been sand hills, but had been reclaimed by such men as James Hutchison of Gailes, Irvine and Thomas Reid of Montonmiln, Monkton. Mr. Reid had grown wheat for some time, but felt that the land could no longer support it and turned to oats and rye.[23] Rye was also found occasionally on improved moss. In 1870 the parishes with the highest rye acreages were the coastal ones; Newton-Upon-Ayr 9.31%, Irvine 4.51% (see map 4:7).[24]

Buteshire

Rye was not mentioned in the first agricultural report or in the O.S.A. When writing in 1816, Aiton stated that rye was hardly known in the county, although the sandy soils were suitable for it.[25] In the N.S.A. rye is again not mentioned, but by 1854 there were 71¼ acres in the county, and the crop continued to be grown for the remainder of the period, the lowest total being 27 acres in 1856 (see table 2:26).[26] In 1870 rye was grown in every Buteshire parish, although in tiny amounts.[27] The highest percentage of land covered was 1.67 in Cumbrae and the lowest 0.09 in N. Bute.

Dunbartonshire

In Dunbartonshire in 1794 rye cultivation was greatly on the decline, and there is no further evidence of its growth until 1854 when there were 59¾ acres.[28] The total fell quickly, and in 1856, 1866 and 1872 there was none at all.[29] As in other counties the total fluctuated from year to year. In 1870 there was only one acre and

this was in Cumbernauld (see table 4:26 and map 4:7).[30]

Lanarkshire

Here rye was found to be productive on dry sandy soils, and was sown in October after potatoes.[31] It was said that 24 bolls of rye could be reaped from only ½ boll sown on ground which would give poor rewards of other grains, but this seems to be a great exaggeration.[32] Rye was not mentioned in the O.S.A., but did appear in the 1830s. In Dalserf it would sometimes be sown in orchards or in places shaded from birds, but it never gained importance because it was an unpopular food.[33] Again in Hamilton rye was stated to thrive below trees, and it was recommended as an undercrop in orchards.[34] In 1854 there were 164 acres of rye, and this fluctuated markedly for the remainder of the period (see table 4:26). In 1870 rye was grown in 9 parishes, the highest percentage being 0.25 in Bothwell (see map 4:7).[36]

Renfrewshire

In the Abbey parish of Paisley in the 1790s rye was grown to a small extent, but it was not mentioned specifically elsewhere (see map 4:6).[37] In the 1830s it was not mentioned at all. In 1854 there were only 37¼ acres of rye, and the total fluctuated thereafter, the highest figure being 74 acres in 1857, and the lowest four acres in 1874 (see table 4:26).[38] In 1870 rye was grown in only six parishes, the highest percentage of land covered being 1.29% in Renfrew (see map 4:7).[39]

Stirlingshire

In Kilsyth in the 1790s rye was sown only occasionally in tiny

amounts, but was of good quality (see map 4:6).[40] In 1812 however, there was still hardly any rye in the county,[41] and in the N.S.A. it was not mentioned at all. Nevertheless in 1854 there were 101 acres of rye, although this total was never reached again afterwards (see table 4:26).[42] In 1870 rye was grown in only four parishes, in three of these it accounted for less than 0.10% of the land (see map 4:6).[43] In Gangunnock the figure was 1.02%.

CONCLUSION

It is not easy to explain the pattern of rye culture. Until the 1850s evidence is scanty, chiefly because rye was of minor importance. It is clear, however, that Handley's statement that rye was not raised after 1800 except on moor farms in Galloway, must be refuted.[44] Rye was not of great importance, perhaps because it had never gained popularity in the British diet,[45] perhaps because of its propensity to be eaten by birds,[46] or perhaps because it was considered to be an exhausting crop.[47] Since turnips and rye favoured similar soils, the former would be grown on most land which would bear them and rye relegated to the poorer soils. This cannot have been a major factor, however, as even in the seventeenth century, when turnips were grown just as a garden crop, rye was grown extensively but never in large quantities.

Despite its unsuitability for improved districts rye continued to be grown in varying amounts throughout the period. It may have been raised on poor sandy soils or acid moorland which could produce little else, or as an extra crop in orchards.[48] The old practice of planting rye on outside rigs to prevent damage by poultry may have been used, but the localisation of the crop in 1870 points away from this.[49]

The most likely explanation is that rye was grown for its straw which was highly valued for thatching.[50]

The acreage figures from 1854-1874 are confusing (see table 4:26). They fluctuated from year to year in a way which showed no pattern. There seems to be no correspondence between fluctuations in this and in other grains, and there are no rye fiars to text against acreages. It is noticeable that in all counties except Stirlingshire, acreages fell from 1871 to 1872, rose in 1873 and fell in 1874. Stirlingshire experienced the exact opposite, but it is difficult to explain why this should have been. One possible explanation for the erratic nature of changes is as follows:- Since rye was grown on worn out land or light-sands useless for other grains, periodically this would have gone out of use, thus causing a decline in the acreage. Once rested part of it at least could have been replanted. A similar arguement would apply if rye had been used periodically in rotations, or if it was grown for thatching which would have been renewed only occasionally. Any one, or a combination of these factors may explain why fluctuations were marked but uncoordinated.

In any event it is clear that rye was the least desirable of the grain crops, and would have been the least responsive to price incentives.

GENERAL COMMENTS

Grain crops had an important place in the farming systems of the period and area of study. Oats were the major crop occupying much more land than the other grains, as one would expect considering their role in the traditional Scottish farming system. Barley and wheat could to some extent, replace oats in rotations, but were not real competitors. They did, however, compete with one another for the valuable dung. Barley had been the traditional drink crop, and overall occupied more land than wheat, although in particular counties at various times was subsidiary to wheat. Of all the grains, wheat was the one from which the modern breads, biscuits and cakes, consumed by the urban populations, were made. All things being equal, wheat could be the most profitable grain, although it was not the easiest to grow, and was not suited to many Scottish farms. Numerous farmers did grow it successfully, but towards the end of the period, Britain suffered severely from the competition of large-scale foreign producers. Rye was a minor crop grown only on very impoverished soil, or in small amounts.

If the acreages of all grain crops are taken together (see table 4:27) there are no clear-cut trends, although in every county the acreage at the end of the period was markedly lower than that at the beginning. It would seem, therefore, that although one grain crop could replace another to a limited extent, all grains gradually suffered a decline. The acreage of land devoted to grains did not remain constant, and within this change there were fluctuations in the importance of the individual grains. It is likely that permanent pasture occupied much land which had previously been under grain.

Table 4:27

TOTAL GRAIN ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	28616¾	76009½	5732¾	12289½	65264¼	20844¾	33501
1855	26730	75828¼	5701½	13017½	64795	21412	34180¾
1856	26978	79165¼	5777¾	13591	65926	22138¼	35074
1857	28023½	80329¾	5975½	13249¾	67994	22460¼	35453¾
1866	22319	58519	5546	10085	50400	17478	28765
1867	22679	57643	5172	10057	49626	17255	28454
1868	23115	60021	5266	9994	52115	17966	28749
1869	23655	61045	5372	10089	55168	17955	28690
1870	23887	60883	5561	10360	54751	17738	28331
1871	23550	58885	5558	10652	53995	17642	28290
1872	23729	58969	5627	10535	54837	18064	28303
1873	23268	56685	5517	9942	52320	17495	26983
1874	23196	56738	5487	9656	50439	17254	26857

Chapter 5

R O O T S

1. TURNIPS

To many people turnip husbandry epitomizes the agricultural revolution. Turnips (Brassica) made possible the more intensive culture of light soils, and enabled livestock to be better supported in winter and spring.[1] They were the foundation of alternate and convertible husbandry,[2] and Kames had never known of anyone abandoning turnip culture once they had tried it.[3] Part of the crop was dug up in winter and used to house-feed cattle, and the rest was used to feed sheep on the ground or in grass fields.[4] (They were also used to feed dairy cattle, but were thought to taint the milk - see below).

Gravels were the most suitable soil for turnips, but all comparatively dry soils could support them if correctly prepared.[5] They tended to fail on clayey or waterlogged soils, but their popularity was such that they were grown there too.[6] On land intended for turnips, the frost was allowed to break up the ground, and care was taken to eliminate wetness.[7] If weedy, the brake was used in April or May, then shallow ploughing took place in June, followed by liming or dunging and harrowing.[8] Weeds were gathered and used as compost.[9] If turnips followed grain out of pasture, dunging was not always necessary.[10] June was considered to be the best time for sowing, but this meant that the crop was ready for feeding in November, December and January.[11] If March, April or May feeding was required, sowing had to be in July.[12] Turnips were usually drilled, although they could be broadcast, and

the rows were set 27-30" apart.[13]

The commonest sorts of turnips used were the white-topped Norfolk and the Globe, although the yellow field turnip had, in 1814, recently been introduced, and other varieties were sometimes tried.[14] The crop was subject to damage by the black fly, and the only means of dealing with this seems to have been to sow thickly, thus providing sufficient for man and fly![15] In this case the plants needed careful hoeing and thinning at a later stage.

Swedish turnips (Ruta-baga) had, in 1814, only recently been introduced into Scotland.[16] They had to be sown a fortnight earlier than turnips, but developed later, and did well on heavier soils.[17] They could also be stored under straw (topped and tailed) for indefinite periods.[18] This meant that they were useful for feeding stock after the exhaustion of the turnip crop.[19]

Argyllshire

In the 1790s turnips seem to have been uncommon, although in Nether Lorn they were slowly coming into general use.[20] There were no field turnips in Ardnamurchan.[21] In Kilbrandon and Kilchattan, and Lismore and Appin experiments had shown that turnips would be beneficial, but they were not yet grown on a large scale.[22] In Inverary, Kilmalie and Tiree too they were felt to be useful but were hardly used.[23] Some people in Killean and Kilchenzie had raised turnips, and it was felt that more of them would do so if the land were enclosed.[24] In Kilcalmonell and Kilberry and Glenorchy and Inishail, there were a few turnips, and they were also grown in Kilmadan.[25] In Kilcalmonell and Kilberry all Lord Stonefield's tenants sowed turnips; they were well adapted to the climate, but could succeed only when the tenants had enough small enclosures.[26] One Mr. Sinclair in Whitehouse had

successfully fed cattle on turnips when on bere straw in winter.[27]

Even in 1813 turnips were uncommon crops.[28] No explanation was offered for this, and in the Hebrides were found only in Gigha, Colonsay and a few farms in Mull, Coll and Tiree in 1808-9.[29] They had been tried 20-30 years previously, and had been abandoned, but new trials had found them to be advantageous.[30] They were expected to spread, and to be used as a cleaning crop or to replace dry straw for winter feeding.[31] Swedes had been grown only in gardens, but were felt to be worthy of more attention since they filled the gap between turnips and grass.[32] In the 1830s turnip culture had still not been adopted universally, but turnips were more popular as they were grown in several parishes.[33] In Ardchattan they succeeded well, but lack of enclosures were blamed for preventing their more general introduction.[34] In Kilfinichen turnips were grown on the larger farms, and in Kilmartin they were raised extensively.[35] In Kilninian they seem to have been introduced recently.[36]

The turnip acreage increased during the 1850s, but by 1866 had fallen slightly.[37] Thereafter it remained fairly constant, but by the end of the period a small decline had occurred (see table 5:1). In 1870 turnips were grown in every parish, and in all cases covered at least 1% of the ground (see map 5:1).[38] In Southend the figure was 8.26%, in Campbeltown 8.07% and in Kilchonan 8.01%

Ayrshire

Turnips had been introduced as field crops by the Earls of Eglinton and Loudoun before the mid eighteenth century.[39] By 1793, however, only a few ordinary farmers raised turnips, although their results were excellent.[40] Some pulled every second turnip to feed

housed cattle and let sheep eat the remainder off the ground.[41] In Dalry in the mid 1790s turnip culture had been introduced 'last year', and had been very successful.[42] In Craigie there were no turnips and in Kirkmichael they had been tried, but the soil was found to be too wet, and farm servants objected to the cold dirty work which the crop required.[43] The soil in Galston parish, especially towards Strathavon was well adapted to turnips, but few were yet grown.[44] In Symington and Stair small amounts were sown, but in Kirkoswald they were little used except on Lord Cassillis' farm where they had proved successful.[45] In Tarbolton turnip culture was not established, but it was increasing in popularity, while in Dreghorn only two farmers had sown turnips.[46] In Auchinleck the clay soil had prevented the introduction of turnip husbandry, and in Stevenston it had not even been attempted.[47]

By 1811 turnips had spread to all soils, although they did best on light land.[48] The ground was ploughed several times, and then 14-15 tons of dung per acre were laid down; lime was seldom used.[49] The seed was steeped before sowing, and the produce was used mainly to fatten cattle, or occasionally was eaten off the ground by hurdled sheep.[50] They were valued as winter feed for dairy stock.[51] Swedes too were grown and being less susceptible to the fly and lasting longer in spring, were extremely popular.[52]

In the 1830s turnips were fairly common and were raised in numerous parishes. In Ballantrae there were 110 acres of turnips compared with 254 of potatoes.[53] In Coylton the turnip acreage was increasing, in Dailly they were replacing potatoes on the larger farms, and in Stewarton they were becoming more popular because of their value in feeding dairy stock.[54] In Straiton turnip culture was extending on the dry, gravelly soils along the banks of the Girvan, while

in Tarbolton turnips were grown on every farm.[55]

In 1854 there were 15158½ acres of turnips, and this had increased to 17796½ acres by 1857 (see table 5:1).[56] The total had fallen considerably by 1866, and continued to decline with a slight recovery in 1871 and 1872, until the end of the period.[57] In Carrick the acreage of turnips in 1856 had been much greater than that in 1867, although dairying had increased in importance since then.[58] Sturrock felt that farmers should grow fewer turnips and manure them properly.[59] They were though to produce watery milk although it was agreed to be abundant in quantity.[60] Mangel-wurzels were felt to be more nutritious than turnips, and gave richer milk, the taste of which was untainted.[61] They were, however, an unreliable crop and Irving and Murray felt that mangel-wurzels were not worth the extra manure needed.[62] In 1870 turnips were grown in every parish, although in some cases covered very small percentages of land (see map 5:1).[63] The highest levels were 8.90% in Maybole, 8.00% in Kirkoswald and 7.62% in Kirkmichael.

Buteshire

In 1794, turnips were not listed among the crops grown in Arran, but were found in the more advanced island of Bute.[64] Turnips did not merit a mention in the O.S.A. By 1809 they were found in both Arran and Bute, and did well where they were tried.[65] Nevertheless, in 1816 there were relatively few turnips in Arran, although they were grown by the best farmers in Bute and by some in Cumbrae.[66] By the 1830s, turnips were grown in Kingarth, but in Rothesay were 'hardly known'.[67] In Kilbride winter turnips were sown on 103 acres, and although not mentioned by name, were probably grown in Kilmorie as 'green crops'

Table 5:1

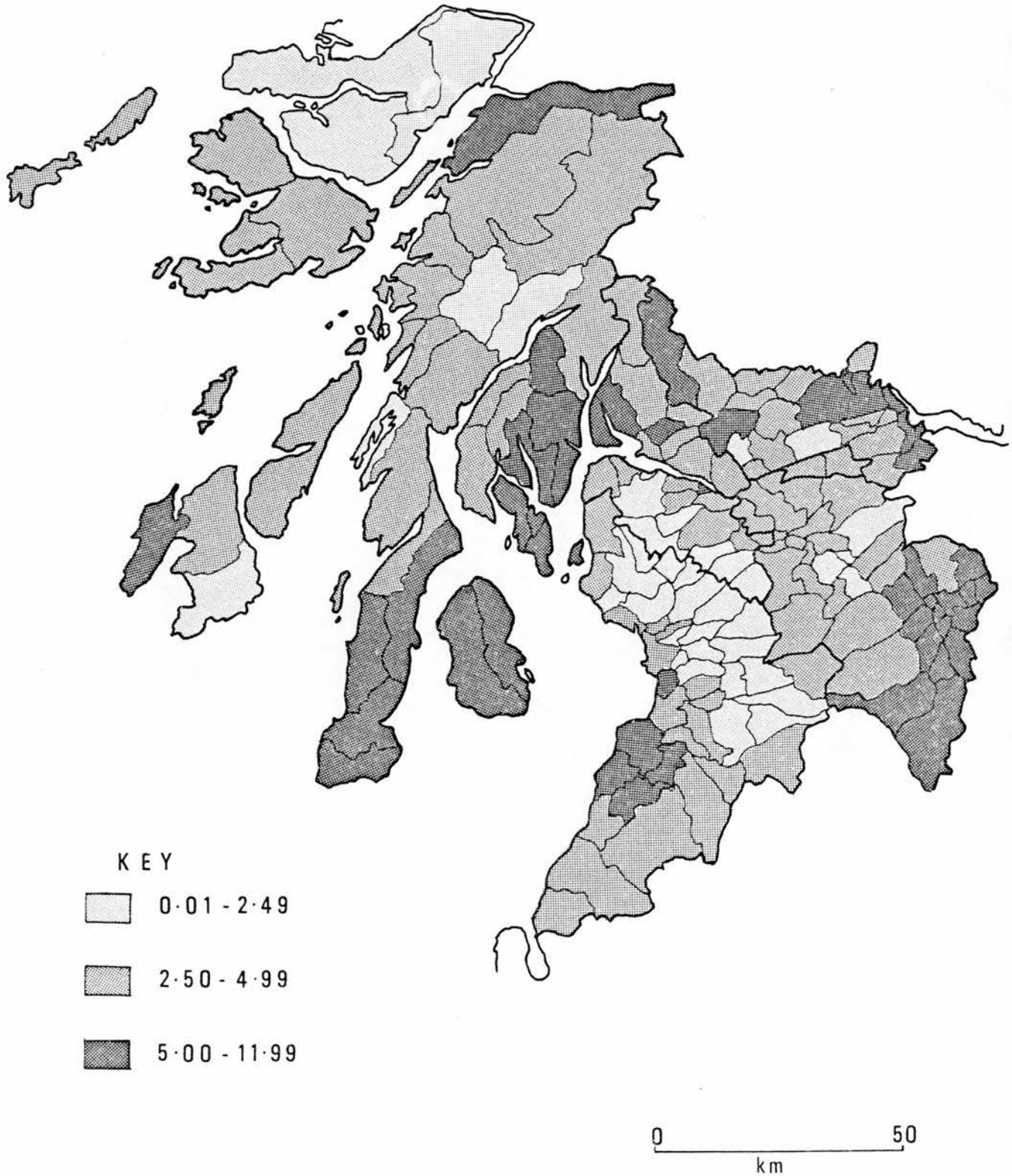
TURNIP ACREAGES - INCLUDING SWEDES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	5623	15158½	1509¾	2419½	10885¾	2995¼	5432
1855	6346¼	16480¾	1609¼	2567	11341½	3334	5963½
1856	6337¾	16464¾	1607¾	2449¼	11443	3134½	6197½
1857	6832¼	17796½	1923½	2622	11934	3470	6158¾
1866	5553	10083	1483	1989	10608	2468	4985
1867	5451	9941	1524	2216	10664	2924	5524
1868	5555	9847	1574	2131	10646	2734	5313
1869	5300	9522	1539	1951	10021	2517	5035
1870	5493	9457	1580	1850	10398	2363	4885
1871	5685	9562	1598	1943	10235	2413	5106
1872	5600	9703	1661	1947	9639	2300	4681
1873	5345	9340	1738	1894	10272	2400	4965
1874	5244	8982	1971	1931	9616	2485	5026

MAP 5:1

TURNIPS & SWEDES AS PERCENTAGE IMPROVED LAND 1870



were included in the rotations.[68]

In 1854 turnips occupied 1509¾ acres of improved land in Buteshire, and as in other counties the figure rose in 1855 (see table 5:1).[69] The acreage fell marginally in 1856, but rose substantially in 1857.[70] As elsewhere the total had declined considerably by 1866, it fluctuated until 1871 when it began to increase steadily.[71] The latter pattern was not universal. The highest percentage of turnips in 1870 was found in North Bute (10.51%) and the lowest in Kilbride (5.08%)(see map 5.1).[72]

Dunbartonshire

In 1794 turnips had recently been attempted in fields, but they accounted for only 24 acres in the county.[73] They were drilled, and reasonable returns had been obtained, so they were expected to spread.[74] Turnips were grown in Bonhill, but their culture was in its infancy in Cardross and Kirkintilloch.[75] In New Kilpatrick and Cumbernauld a few turnips were grown.[76]

By 1812 small quantities of turnips were grown on almost every farm in the county, and swedes were grown with them in many cases.[77] Attempts to feed sheep on the growing crop had failed because the wet weather caused foot rot in the sheep when feeding.[78] Many farmers raised only sufficient to give milk cows a little green food in winter, but others grew more turnips to fatten stall-fed cattle for the butcher.[79] At Roseneath (Duke of Argyll) there was no real profit from the turnips themselves, but they prepared the fields for the next crop and helped produce dung.[80] Turnips were preferred to swedes since they interfered less with the other work, but there was prejudice against turnips as the carting off of the produce frequently damaged the land.[81]

In Cumbernauld in the 1830s turnips were common on every farm,

and were still increasing in popularity, although twenty years previously few had been grown.[82] In Old Kilpatrick there were 264 acres of turnips compared with 721 of potatoes and 985 of oats, and in New Kilpatrick 1872 tons of turnips were produced and 4545 tons of potatoes.[83] There the soil was thought to be unsuitable for turnips and only sufficient was grown to supply the dairy cows.[84]

In 1854 there were 2419½ acres of turnips, and by 1857 the figure was 2622 (see table 5:1).[85] The total fell by 1866, and never again reached such a high level although fluctuations did occur.[86] In 1870 turnips were grown in every parish and accounted for more than 3% of the improved land (see map 5:1).[87] The lowest percentage was 3.23 in New Kilpatrick (where the soil was considered unfavourable in the 1830s), and the highest 5.59 in Roseneath, so the variation between parishes was not great.

Lanarkshire

In 1794 turnips were grown; planting being carried out in April-May.[88] Since their introduction into the upper part of the county the land was fallowed in Spring, and the turnips drilled in.[89] On the light soils of the lower part of the county the land was too highly rented for turnips, and potatoes were used instead because there was a great demand for them from the 'populous district'.[90] In Walston in the 1790s farmers were only beginning to sow turnips, in Carmichael there were few turnips, while in Lanark, Pettinain, Crawford and East Monkland they were not common although trials had been made.[91] In Stonehouse there were no turnips, but in Carnwath they had been introduced recently by Lockhart of Lee and Carnwath.[92] Here tenants were required to use a particular rotation after turnips and although unpop-

ular at first, it had proved its worth.[93] In Lesmahagow the soil was considered suitable for turnip culture but it was not much practiced, although on the fluvio-glacial sands and gravels of Dolphinton many turnips were grown and did well.[94] In Dunsyre they had recently been introduced, but were not grown in Hamilton.[95] In Lamington they were used to feed cattle so as to produce manure.[96]

In 1811 turnip husbandry had been recently introduced on Burnhouse Farm, Carmichael, and it was hoped that it might be tried on all Drumalben farms.[97] By 1813 turnip culture had become diffused from the light soils so that almost every farmer practised it even on stiff land.[98] In the 1830s turnip culture was very popular in Pettinain and much care was taken to prepare the ground, consequently the crop was excellent.[99] All types were grown, but globe, red-top, and yellow were the most common varieties and had replaced swedes.[100] In Avondale, despite the suitable soils and the importance of cattle rearing, turnips were not much cultivated.[101] In Cadder there were 140 acres of turnips compared with 510 of wheat and 1900 of oats, while in Biggar turnips accounted for 184 acres, wheat 16 and oats 1018 acres.[102] Turnips had been grown in Govan since their introduction in 1756, and in Crawfordjohn it was felt that they should be made more of.[103]

The turnip acreage increased between 1854 and 1857, but by 1866 it had fallen again and with minor recoveries continued to decline until 1874 (see table 5:1).[104] In 1870 turnips were grown in every parish, the highest percentage being 11.87 in Dunsyre and the lowest 1.87 in Hamilton (see map 5:1).[105] There was, therefore, considerable variation in Lanarkshire in the percentage of improved land given over to turnips.

Renfrewshire

In 1794 there were no turnips on the open fields of Renfrew, but Spiers of Elderslie was taking in a large field and improving it by a rotation including turnips.[106] Cuningham of Craigends had also used turnips to improve land, and Fulton of Hartfield and McDowall of Gartland used them in their rotations.[107] Close to Finlaystone a tenant, bound by his lease to raise turnips, had doubled the price of his cattle by their use.[108] In the 1770s Alexander, Lord Blantyre had attempted to introduce the modern ideas practiced in East Lothian to his estate in Erskine.[109] His stipulations regarding turnips had, however, to be relaxed because of unspecified complaints by tenants.[110] In Paisley Abbey in the 1790s turnips were little cultivated and in Mearns only small quantities were sown.[111]

By 1812 there were very few turnips except at 'gentleman's seats'.[112] Attempts had been made to grow them, but except on the higher land the soil was too stiff.[113] In addition the farmers were prejudiced against them.[114] Even in the 1830s in Mearns turnips were not cultivated as much as they could be.[115] They were used in Erskine, and in Paisley where there were 20 acres in the upper division compared with 80 acres of potatoes and 400 of oats, while in the lower division there were 220 acres of turnips, 1320 of potatoes and 2750 of oats.[116] The acreage of turnips increased from 1854 to 1857, but had fallen markedly by 1866 and after a small rise continued to fall before recovering slightly at the end of the period (see table 5:1).[117] In 1870 turnips were grown on a fairly small percentage of the improved land in every parish (see map 5:1).[118] There was considerable variation between parishes and the highest total was 5.12% in Inchinnan and the lowest 0.69% in Renfrewshire's Govan (part of the parish was in Renfrewshire at this time).

Stirlingshire

In 1796 turnips had been tried by several proprietors, but the land was too wet for feeding off.[119] In populous areas the crop could be sold for human consumption, and its use seemed to be spreading in the breeding areas.[120] In Baldernock and Kippen successful trials of turnips had been made but few were sown, and in Gargunnock they had recently been introduced and were found to be profitable, but were not favoured by the tenants.[121] In Campsie turnips had been found to stand up badly to the winter.[122] They had also been tried in Buchanan and succeeded, but were unpopular because people were collecting peats at the time that they needed most attention.[123] In Strathblane, however, turnips were substituted for summer fallow but in Killearn they were not found as a field crop.[124] Spiers of Culruich in Fintry had cleared ground by use of turnips, and had introduced other beneficial new practices which the farmers had copied.[125]

In 1812 turnips were said to have been recently introduced.[126] They were thought to be more exhausting than potatoes, but this was perhaps because potatoes were given more dung.[127] Many Stirlingshire soils were ill-suited to turnips especially the heavy land west of Falkirk.[128] Turnips were, however, cultivated to a limited extent on the heavy carse land, but it was chiefly grain country and there were few cattle.[129] The lighter land was more suitable and did well under turnips.[130] The soil was first pulverised and dunged, the seed was drilled in June-July and then hand and horse-hoed.[131]

By the 1830s turnips were grown in several parishes.[132] They were raised on the dryfield in Logie, Stirling and St. Ninians.[133] In Baldernock there were only 42 acres of turnips compared with 183 of wheat and 584 of oats, and in Polmont 80 acres compared with 540 of wheat and 700 of oats.[134] In 1854 there were 5432 acres of turnips,

and the figure increased until 1856, but declined slightly in 1857 (see table 5:1).[135] There had been a substantial decline by 1866, and the total fluctuated thereafter with a slight net increase having occurred by the end of the period.[136] As elsewhere turnips were grown in every parish in 1870 (see map 5:1).[137] They occupied 10.66% of improved land in Lecropt, the highest total, and only 2.01% in Strathblane, the lowest.

CONCLUSION

At the beginning of the period turnips were still a novelty, they had been adopted by several proprietors but were in the trial stage with tenant farmers. Their advantages were soon realised by experience, and turnips had spread widely in the first few decades of the nineteenth century. They were still not popular in conservative Argyllshire, where the climate was less suitable for them, although they had become more popular by the 1830s. On the heavy soils of Renfrewshire and West Stirlingshire, turnips failed to gain popularity perhaps because there was a nearby urban market for more suitable and more expensive crops.

By the 1850s substantial acreages of turnips were found in every county, and in all cases these increased slightly from 1854 to 1857. This was perhaps a response to rising livestock prices.[138] By 1866, however, the turnip acreage had fallen below the 1854 level, and with fluctuations which do not correspond between counties, continued to fall during the remainder of the period. It is difficult to explain why this should have occurred at a time when livestock farming was becoming increasingly important. It may reflect a decline in the area incorporated in rotations, a restriction of turnips to the lighter land

to which they were best suited, and a sowing down to grass of the heavier clays as livestock farming increased in importance. It must also be remembered that imported oil-cake was increasingly available at this time.[139]

Turnips seem to have been grown over a wide area. In 1870 they were found in every parish in the area. In many cases they covered a high percentage of the improved land; the highest figures were 10.60 in Lecropt and 11.87 in Dunsyre. This probably reflects the important role of turnips as a cleaning crop, and their valued place in rotations.[140] They were particularly important on light land for the production of dung,[141] and as well as being valuable in arable rotations, they were useful as a stock feed and facilitated the use of alternate and convertible husbandry, which with minor alterations to meet changing demands, could supply the market with animal or vegetable produce. This must have been the wisest course when, after the Repeal of the Corn Laws, British farming was left with the possibility of increasing foreign competition and with the uncertainty of rapidly changing conditions. Turnips then may be seen as an indispensible item in British agriculture, and one which was sufficiently versatile to fit into changing patterns of farming.

2. POTATOES

The potato (Solanum tuberosum) was introduced into England in the sixteenth century, and into Scotland at the end of the seventeenth, but it was not until the eighteenth century that it began to be cultivated as a common field crop.[1] Potatoes proved themselves indispensible as human food, and were valuable for animal feeding.[2] Potatoes required attention at the time that wheat was sown, and therefore their use could be inconvenient.[3] Being bulky, they were troublesome to harvest and market, so it was uneconomic to transport them long distances.[4] They could, however, be grown profitably near towns and villages, and were raised extensively elsewhere in small patches for family use.[5] They required large amounts of dung, and this could best be obtained near towns and villages.[6] Several varieties were in use, but the most common were the round white, long white and round purple.[7]

In 1813 potato culture was said to have greatly increased due to skillful cultivation, market demand, the system of granting potato ground, and the value of the crop in preparing for wheat.[8] Potatoes would grow in most soils including acid types, but loams and sands were best.[9] Gravels and sands, not too dry, were thought to produce the most palatable potatoes, while those from black loams were thought adequate for stock feed.[10] On a large scale, the plough was used to grow potatoes, but for smaller patches, spade cultivation was usual.[11] After harvest, the land was furrowed, braked and harrowed, then formed into 3 foot ridges and left until April.[12] The potatoes could then be planted, and dung was used in the sets.[13] Once the plants sprouted the ground was ploughed again, and a penultimate ploughing was given when the plants were about 6 inches high.[14] The crop was ploughed again

when ripe, and was then lifted by fork and gathered by hand.[15]

Argyllshire

In the 1780s potatoes were becoming more usual, but were still not general, although by 1794 they were common on the Breadalbane estates.[16] They were raised in Kintyre in areas where the tenants were unable to protect sown grasses and turnips.[17] In Lismore they were grown after two or three bean crops and two oat crops.[18] In Glencoe the climate was acknowledged to be too wet for potatoes, but they were raised there with the aid of dung.[19] In Dunoon, potatoes had been extensively cultivated in the past 20 years, many by drill, and added greatly to the food of the common people.[20] They were raised in numerous parishes, and in many areas were the main food, maintaining the common people for up to nine months of the year where previously they had gone short of food.[21] Potatoes were grown with great care, drilled and plough-hoed, and in Campbeltown they were the chief crop.[22] In Inverchaolain bere and potato ground was manured with dung from black cattle, and in Craignish potatoes had recently been planted in drills with a resultant lessening of work and an increase in production, but it was felt that this method more quickly exhausted the land.[23] In Morvern the return had been increased from 10:1 to 25:1 by use of drills instead of lazy-beds.[24] In Kilninian potatoes were planted in the beds by the spade, and the returns were poorer than elsewhere.[25] In Kilmalie where drilling was used, potatoes did well, and in Tiree a dramatic improvement had been made from 5:1 to 8-32:1 by use of drills.[26]

In c1813 potatoes were the main food of most people for nine months of the year.[27] Farmers planted them in drills, but the poor persisted with the lazy-bed method.[28] Potatoes were planted on poor ground after

oats.[29] It was ploughed in winter and early spring, then harrowed before planting.[30] Infield land was well adapted to potatoes, being slightly dry, well pulverised and under constant tillage.[31] The outfield was stiffer and needed more ploughing, but potatoes were thought to be a good way of bringing in waste ground.[32] The average return was 9-16:1, and the commonest varieties used were the Scotch grey, lady white and pink eye.[33] In the 1830s potatoes were still grown extensively. In Ardnamurchan several tenants sowed them, and on small plots they were often the only crop.[34] In Gigha and Cara potatoes were preferred to turnips because there was a great demand from Ireland for seed.[35] In Kilcalmonell they were deeply involved in commercial production, being the main farm crop which was exported to England and Ireland.[36]

Gray felt that Argyllshire suffered less from the potato famine of the 1840s than did the North-western Highland counties.[37] The economy was more diverse with less pressure on the land and fewer poor crofters. In Mull, however, the potato famine had hit hard, for Tobermory was already crowded with people displaced as a result of the spread of sheep farming.[38] In 1854 the potato acreage of the county was 6179, slightly higher than that of turnips.[39] Until 1857 it fluctuated in direct contrast to the turnip figures, but except in 1854 potatoes occupied less land than did turnips (see table 5:2). By 1866 the total had fallen only slightly and then rose until 1869, so that potatoes occupied more land than turnips, and in 1869 the difference between the figures was quite substantial.[40] From 1870 there was a steady decline in potatoes, although they were still more extensive than turnips.[41] In 1870 potatoes were grown in every parish, although the percentage of arable which they occupied varied considerably (see map 5:2).[42] In Ardnamurchan the figure was 26.29%, while the

next highest was 13.98% in Tiree. The lowest figures were 2.74% in Coll and 2.98% in Southend.

Ayrshire

Potatoes had been grown as a field crop since 1729 and in 1793 potatoes were a universal crop, raised by everyone for home use.[43] They were ploughed, drilled and planted in April, and lazy-beds were not in use.[44] In Colmonell potatoes were sown extensively and did well even in the worst areas.[45] They were the main subsistence of the poor who often had land given to them on which to grow potatoes.[46] Wheat did well after potatoes and even on small plots of land rented by town people in Kilmarnock, wheat followed potatoes.[47] In several parishes, potatoes were grown for family consumption.[48] In Sorn they were grown on small plots by villagers, as well as for cattle and horse fodder.[49] In Galston potatoes were raised by the cottagers, and this was thought to be a useful hobby although they could buy them as cheaply from local farmers.[50] In Dalry the farm dung was used chiefly on potatoes which preceded wheat.[51] In Kilwinning the land was also dunged for potatoes, but oats or bere were taken as the succeeding crop.[52]

Aiton recognised potatoes as a valuable crop which had long been cultivated to advantage.[53] Although they did best on sands, they were frequently sown on clays, and did very well on moss.[54] The crop was drilled, ploughed and horse-hoed, and 15-35 tons of dung per acre were laid down.[55] Potatoes were a useful stock food, and were served steamed to cattle.[56] They were a good preparation for grain, in the most improved areas wheat followed, and in the higher parts oats.[57] Potatoes produced a better succeeding crop than did turnips, but did not clean the ground as well.[58] In about 1820 two-thirds of the

Table 5:2

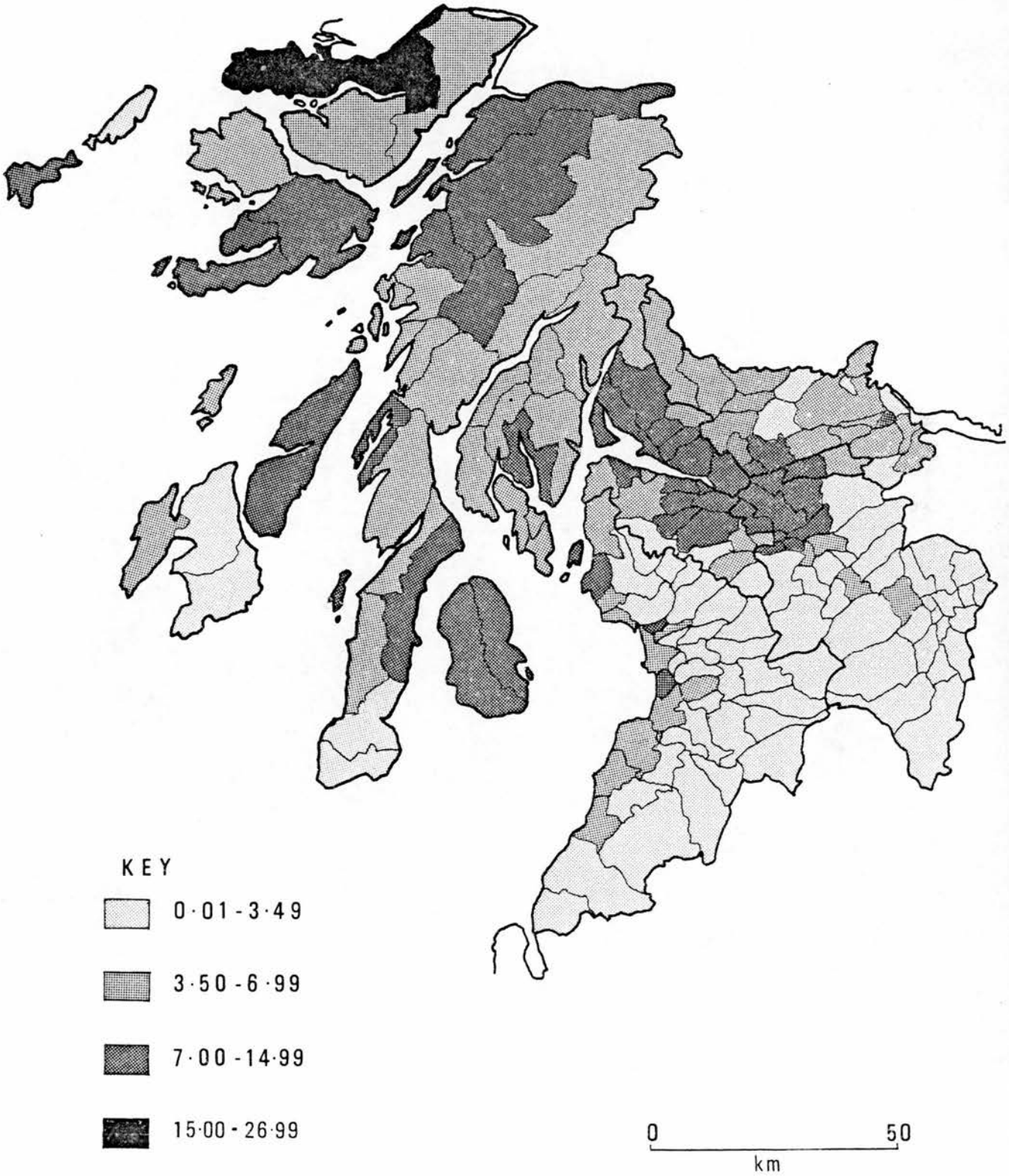
POTATO ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	6179	8386½	1078¼	2368½	8016¾	5500¾	3321¼
1855	5178¾	8166½	967½	2378	8202¼	5534½	3607
1856	5883¾	8688½	1065¼	2727½	8733¼	5935¼	3904½
1857	5569¾	7075½	849¼	2500½	8253¼	5729½	3881
1866	5473	7151	1034	2636	6646	4528	3820
1867	6179	7394	1032	2655	6967	4859	4218
1868	6535	7302	992	2647	7404	5009	4525
1869	6842	8471	1177	3126	8776	5475	5064
1870	6698	8777	1430	3392	8816	5486	4941
1871	6632	8093	1436	3461	9064	5574	4963
1872	6486	6967	1249	2826	8344	5082	4378
1873	6465	6283	1183	2459	7485	4381	3809
1874	6577	6552	1209	2330	7092	4289	3555

MAP 5:2

POTATOES AS PERCENTAGE IMPROVED LAND 1870



acreage had been planted close to towns and villages by the poorer people on land rented from farmers.[59] This cultivation reached a climax from 1835 to 1845, but fell abruptly with the blight of 1845-6.[60] Potato culture had slowly expanded since 1846, but in many of the inland areas, farmers grew only enough for thier own use.[61] They were confined chiefly to the warm coasts between Largs and Ballantrae, where the growth of early potatoes was very renumerative. The crop was manured with farm dung and seaweed, supplemented by Peruvian guano. Farmers carted the potatoes to the nearest railway station, and from there dealers coped with the crop. Early potatoes and wheat were grown alternately on the Girvan shore for some years.[62] In the N.S.A. potatoes were mentioned widely. They were abundant in Auchinleck although turnips were more so and in Dailly were being replaced by turnips, although wheat did well after potatoes.[63] In Dunlop and Stair they were grown for home use, but in Monkton were the most valuable crop and in Stewarton they were grown extensively.[64]

In 1854 there were 8386½ acres of potatoes, considerably less than the turnip acreage, but the amount fluctuated in the opposite way to turnips (see table 5:2).[65] Sturrock wrote that there had been an increase in early potatoes since 1857.[66] By 1866 the potato acreage was slightly higher than in 1857, and continued to rise until 1870 but then fell markedly.[67] In 1870 potatoes were grown in every parish, but generally covered only a small percentage of the arable (see map 5:2).[68] The highest was 11.63% in West Kilbride and 10.24% in St. Quivox, but in Ballantrae the total was only 0.58% and in Craigie 0.79%.

Buteshire

In 1794 potatoes were grown in both Arran and Bute and were a

major crop in the latter.[69] In Kingarth and Kilbride in the 1790s potatoes were grown extensively and maintained the inhabitants for nine months in the year (in Kingarth herrings were also used in this respect).[70] They were also found in Kilmorie where 330 bolls were sown, compared to 1320 of oats and 190 of barley.[71] In 1811 potatoes were said to provide the bulk of the nourishment of the people in the county.[72] In 1816 they still maintained the people of Arran for about nine months of the year, and were also used in Bute and Cumbrae.[73] They were drilled in Bute and Cumbrae, but lazy-beds were used in Arran although improvements were taking place.[74]

In the 1830s potatoes were still grown in all parishes in the county for which crop information is available.[75] By 1854 there were 1078¼ acres of potatoes in the county, and the figure fluctuated for the remainder of the period, reaching its maximum in 1871 (see table 5:2).[76] In 1870 potatoes were grown in every parish in the county and covered 9.45% of the improved land in Cumbrae, and even in Rothesay, where there was the lowest percentage, accounted for 6.15% of the improved land (see map 5:2).[77]

Dunbartonshire

Potatoes were universal by 1794, and every family had a plot.[78] They were useful for improving waste and mossy soils, and could be planted in land from which only the brushwood and big stones had been removed.[79] They were usually drilled and horse-hoed, but the lazy-bed method had been successful for bringing in ground; the crop repaid the work, and the ground was well prepared for oats.[80] In Old Kilpatrick they were sown between two oat crops and were raised in many parishes in the 1790s.[81]

By 1811 potatoes were planted in all soils, but they did best in gravelly loams.[82] In the Highlands lazy-beds were used, and although the crops were of good quality, the quantity was poor.[83] If possible the crop was drilled and horse-hoed, but tradesmen grew them by dibbling although less satisfactorily.[84] Many potatoes were eaten on the farm by cattle and could be used to fatten hogs (sheep) and feed horses.[85] Most of them were for human food, and were sold in Greenock and Glasgow or used locally.[86] Oats or wheat did well as a succeeding crop, but barley was uncertain.[87] In the 1830s they were grown in several parishes.[88] In Cumbernauld the potato acreage had greatly increased.[89]

By 1854 there were 2368½ acres of potatoes in the county, slightly less than the total for turnips.[90] The figure rose until 1856, overtaking the turnip figure which never again caught up, then fell slightly (see table 5:2).[91] In 1866 there had been a slight increase, and this was maintained until 1871, when the total fell off considerably.[92] In 1870 potatoes were grown in every parish and covered a fairly substantial percentage of the land in each case (see map 5:2).[93] The highest figure was 9.93% in Cardross and the lowest 5.19% in Kilmaronock.

Lanarkshire

Potatoes were sown widely in the 1790s. In Dalserf they were grown successfully in the valleys, but the clays did not suit them, although they were grown wherever possible to feed livestock and humans.[94] In Hamilton too the ground was rather heavy for potatoes, but they were grown extensively despite this.[95] In Bothwell all farmers grew them for home consumption, despite the unsuitability of

the soil.[96] In Carnwath too they were grown for home use and maintained the people for much of the year.[97] On sandy soils their return was better than turnips.[98] In Pettinain potatoes were grown for sale in Lanark and for stock feeding.[99] They were drilled and ploughed rather than dibbled.[100] In East Monkland potatoes were general for human and stock feeding, but there was said to be a prejudice against them, perhaps because they were subject to curled leaf on wet land.[101] In Blantyre there was a ready market at the cotton mill, so potatoes were carefully grown.[102] In some parishes they were not mentioned, but only in Stonehouse were they stated not to be a field crop.[103]

By the 1830s potatoes continued to be popular.[104] In Govan their culture was very highly developed, chiefly because of the abundant manure available in Glasgow.[105] In Old Monkland a new rotation had been introduced which included potatoes.[106] Excellent potatoes were raised in Carstairs for sale in New Lanark.[107] In Hamilton potatoes were raised both by farmers, as a field crop, and by families on small plots of ground.[108] In Stonehouse by this time potatoes were grown, and in Avondale large quantities of them were raised for sale in the low areas as seed.[109]

In 1854 there were 8016¾ acres of potatoes, and the figure increased until 1856 then fell (see table 5:2).[110] By 1866 there had been a marked decline, but there was a steady increase until 1871, when the highest total of the period was reached.[111] Thereafter the potato acreage declined considerably.[112] In 1870 potatoes were grown in every parish, but the largest percentage of land covered was 10.73 in Glasgow Barony, followed by 9.99 in Govan (see map 5:2).[113] Both these parishes were well placed to serve the urban market. The lowest figures were 1.23% in Dunsyre and 1.27% in Shotts.

Renfrewshire

Potatoes had been introduced early into the county, but had only begun to be popular at the end of the eighteenth century.[114] They were grown in Paisley and Renfrew about 1750.[115] In 1794 potatoes were grown near to the Cart rivers and Sir John Maxwell at Pollockshaws (Eastwood parish) had 30 acres of them.[116] In Lochwinnoch they were, together with oats, the chief crop, and in Kilbarchan they were sown before oats either ploughed or in lazy-beds.[117] In Cathcart potatoes were used instead of summer fallow; the ground was first ploughed and dunged with 40-60 carts per acre then the potatoes were planted in drills, hand and horse-hoed, then wheat was sown.[118] High profits were made because of the proximity of the Glasgow market.[119] In Mearns potatoes were grown only for domestic use, and they were produced in Houston and Killallan, Renfrew and Paisely Abbey.[120] In Erskine potatoes and bere shared the farm dung.[121]

Early potatoes had been rare in 1760, but in 1812 they were grown successfully in drills with the assistance of dung.[122] The area round Glasgow was particularly successful in potato culture.[123] By the 1830s potatoes were grown in most parishes for which crop data are available.[124] The trend in the 1850 and 60s is the same as that for Lanarkshire, although as in Renfrewshire the acreage of potatoes was almost twice that of turnips throughout the period (see table 5:2).[125] In 1870 potatoes were grown universally, the highest percentage of land covered being 14.15 in Renfrew (see map 5:2).[126] The lowest figure was 2.56% in Lochwinnoch.

Stirlingshire

Potatoes were first grown as a field crop in 1728 by one Thomas

Prentice a day labourer in Kilsyth, and then on a larger scale in 1740 by Robert Graham of Tamrower, Kilsyth to supply the Glasgow market.[127] By 1796 the crop had become universal, grown even in strong clays where its success was not marked.[128] Potatoes had been used to feed horses, although experiments with cattle had proved less successful.[129] In Fintry large quantities were grown, and the soil was well suited to them, but in Kippen potatoes were raised only for the family.[130] In Denny there were many potatoes, and they were grown in Alva, Airth and Bothkennar.[131] In Kilsyth and Buchanan every farmer grew potatoes.[132] In Gargunnock they were very popular, and were raised by drill and plough; they were considered a good preparation for wheat.[133] In Baldernock potatoes were grown for home use and for the Glasgow market.[134]

In 1812 potatoes were described as a 'revolutionary crop' for they had inspired new rotations, cultivation methods and eating patterns.[135] They were grown by all farmers for home use, and wherever possible for the market.[136] On the heavy clays they were grown only for family consumption, but on the loams of the west they were very popular.[137] Here they were laid down with dung, but on the sands dung and peat were used.[138] They were mostly plough-cultivated and were succeeded by wheat, barley or oats.[139] Inthe 1830s potatoes were mentioned in several parishes, but little detail was given, perhaps because they were so common.[140]

The pattern in the 1850s and 60s is similar to that in Lanark and Renfrew, apart from a slight decrease in 1870 rather than an increase (see table 5:2).[141] The acreage was usually lower than that of turnips although it surpassed it in 1870.[142] In 1870, as elsewhere, potatoes were grown in every parish, but nowhere covered a very high

percentage of the land (see map 5:2). The highest was 10.14% in New Kilpatrick and the lowest 1.13% in Lecropt.

CONCLUSION

Soon after their introduction in the early eighteenth century potatoes were recognised as a very useful crop, and by the 1790s were well established in all six counties. They were valued chiefly as a human food, but could also be successfully fed to livestock (especially inferior potatoes unfit for sale). They were grown by farmers as a field crop, and by cottagers and day labourers as a food for family use. The poorer people subsisted chiefly on potatoes for much of the year, and were encouraged to grow them as a hobby which was considered worthwhile and as a training in suitable modest virtues.

By the early nineteenth century and into the 1830s potatoes continued to be popular and may well have increased in popularity. They were grown on all types of soil, for the market and for home consumption, and in fields and in lazy-beds. The sources do not offer many clues to the impact of the potato blight which struck Britain in 1846. Its effects are well-known in the case of Ireland, but Scotland experienced it too, and potatoes certainly declined in popularity, at least on a temporary basis.[143]

Nevertheless in the 1850s there were extensive acreages of potatoes in all counties, although only in Argyll and Renfrew were these higher than turnips (see table 5:2). It is difficult to say to what extent the situation in 1854 represents a decline on pre-1846 levels. In any event the acreage increased in all counties in 1856 and in all but three in 1855. There was an overall decline in 1857, and this tied in with the increase in turnips in six counties. By 1866

there had been a decline in four cases, but this was a minor one. Acreage fluctuations occurred thereafter, but were not on a large scale. In Argyll, Bute and Stirling the total at the end of the period was greater than at the start, but in the other counties there had been a decline. This was particularly marked from 1872 onwards, and was probably a direct result of the failure of the crop of 1872.[144] In Argyll, Ayr and Bute a slight increase occurred in 1874, but in the other counties farmers appear to have been more cautious.

In 1870 potatoes were grown in every parish in the area, and this reflects their universal popularity, the ease with which they could be grown, their high profitability,[145] and their low value in relation to bulk (see map 5:2).[146] In many parishes potatoes covered a relatively small percentage of the ground and were probably grown for local use, but in others where perhaps larger markets were available they were more important. The chief potato-growing areas lay close to the large urban centres, although they were also important in Tiree and Jura, remote areas where potatoes would play a vital part in the diet of the inhabitants.

Potatoes were, therefore, chiefly a human food, and their cultivation was linked closely to urban market demand, although they were also grown in many areas for home use. Inferior produce was fed to farm animals, and served well as a stock food. In many areas the inhabitants became so heavily dependant on potatoes for their food that they were in a difficult situation if the crop failed.

3. CARROTS

Carrots were rarely grown as a field crop in Scotland.[1] It was felt that they required too early sowing (early April) for the land to have been properly cleaned.[2] They needed a deep soil, stone free but not clayey, and it was usual to use land which had been dunged the previous year.[3] The crop required much attention while growing.[4] Carrots did however, thrive in drained peats, and since they were a valuable food for work horses, milk cows and fattening stock as well as for humans, they could sometimes play a small part in farming operations.[5]

They were raised in fields in many parts of Ayrshire and had been particularly successful in mossland.[6] Small quantities of carrots were grown in Tarbolton in the 1830s and in Dalrymple for family use.[7] In Dunbartonshire they were sown on gentlemen's farms, but were thought unlikely to spread, as they were not well adapted to the soil.[8] In Lanarkshire they had been successfully grown on open, sandy soil and could be sold in Glasgow at £3 per ton.[9] They were grown on a limited scale in Pettinain in the 1830s, because of their value for horses and for domestic use.[10] In Renfrewshire too they were grown on a small scale because they were good for horses,[11] and were supposed to make their coats glossy.[12] In Stirlingshire in 1812 carrots had recently been introduced as a field crop, and had proved very profitable for those who had raised them successfully.[13] A Mr. Kincaid of Kincaid had in 1807 obtained £5 per ton for them in Glasgow.[14] They were sown on old turnip or potato ground.[15] It is interesting to note that carrots were not mentioned in any of the first series of agricultural reports, and this emphasises their role as a very minor crop.

Despite their small importance, and the fact that Irving and Murray dismissed them as too troublesome, there was a reasonable acreage of carrots during the 1850s, 1860s and 1870s, although it was small (see table 5:3).[16] In all counties except Lanarkshire the acreage had decreased by the end of the period, but in Ayrshire it was fairly substantial. There appears to have been no pattern in the acreage fluctuations. In 1870 carrots were grown in very small amounts in several parishes (see map 5:3),[17] nine in Argyllshire, one in Buteshire, three in Dunbartonshire, 16 in Lanarkshire and seven in Stirlingshire. In Renfrewshire, however, they were grown in 11 of the 19 parishes, and in Paisley accounted for 0.12% of the arable. Perhaps they were grown for human food, and to feed work horses in the urban area. This could have been the reason they were grown in some of the Lanarkshire parishes.

In Ayrshire there were only four parishes in which no carrots were grown, and in several of them relatively high percentages of land were occupied by them. The highest was 1.56% in St. Quivox, followed by 0.57% in Stevenston. Sturrock wrote in 1866 that Ayrshire and Wigtonshire grew carrots on a larger scale than other Scottish counties.[18] At first sight it is difficult to understand why a major dairying county should have grown so many carrots, unless they were used to feed cattle to a greater extent than has been realised, although Sturrock indicates that they were not and Watson and More recommended them only for horses and pigs.[19] Indeed Sturrock pointed out that most dairy farmers did produce them, and they were grown for their juice which was used to colour cheese.[20] The high acreages were, however, found chiefly on the light shore lands, especially St. Quivox where they were grown as fodder for the large numbers of horses in

Glasgow, Liverpool and elsewhere and those employed in the carrying of iron.[21] The non-industrial towns of Eastern Scotland had fewer horses, and presented a much poorer market. In 1878 it was still around Ayr and St. Quivox that carrots were chiefly grown, and they paid well.[22]

For the most part then carrots were a very minor crop occupying small percentages of the crop land. They required deep, light land and considerable labour. They were valuable, however, if they could be marketed as human food, and were also useful in stock feeding, although they were not the most important root for this purpose.

Table 5:3

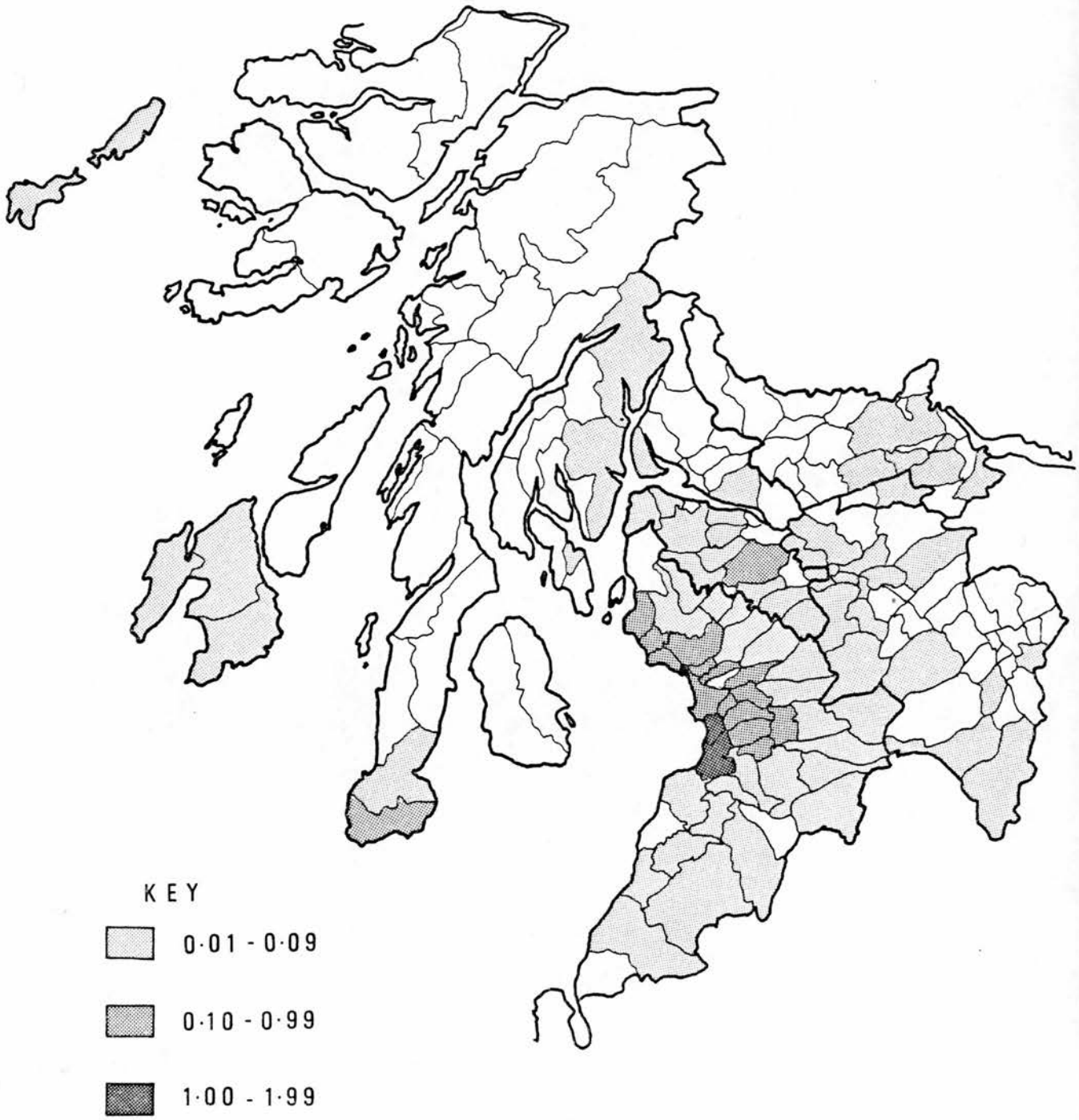
CARROT ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	23¼	322	4½	2¾	23½	23½	7¼
1855	17¼	307¼	4½	6¼	39¾	20½	9¾
1856	35¼	410¼	2¾	5	46½	25¾	14½
1857	25¾	353¾	5¼	4	32¾	18¼	9¼
1866	32	207	4	10	13	5	3
1867	23	177	2	1	16	7	3
1868	22	223	2	0	13	5	0
1869	19	290	1	0	24	7	3
1870	17	363	0	2	24	12	3
1871	21	429	1	2	77	11	7
1872	19	367	2	2	39	14	8
1873	30	399	0	11	29	24	2
1874	15	236	1	3	41	13	7

MAP 5:3

CARROTS AS PERCENTAGE IMPROVED LAND 1870



Chapter 6

SOME OTHER CROPS

1. CABBAGES

Sinclair relegated cabbages to the class of, "articles not commonly cultivated", although they were occasionally grown as a field crop to feed milk cows in winter.[1] In the best managed districts they were thought to be greatly inferior to turnips.[2] By 1924, however, they were considered to be the most important of the forage crops, and were grown in nearly all arable areas.[3] They were useful for feeding to all sorts of farm stock.[4]

In Argyllshire in 1813 cabbages were grown as winter fodder by a few proprietors, but by none of the common farmers.[5] They did well on soils not suited to turnips or potatoes, and did not impoverish the ground especially if seaweed was applied.[6] A few were raised in Kilcalmonell and Kilberry in the 1790s.[7] At Loudoun and Eglinton in Ayrshire cabbages were raised in the fields after the mid eighteenth century, but by 1811 they were grown only in small quantities, perhaps because they needed deep rich soil.[8] They were raised for family use in Dalrymple.[9] In Dunbartonshire too they were grown only by a few gentlemen as a field crop, but some cottagers grew them in their gardens with flax.[10] In Lanarkshire there were few field cabbages, but they were grown occasionally in Renfrewshire and on a small scale in Stirlingshire.[11]

By the 1850s, however, relatively substantial acreages of cabbages were found in every county, in most cases they were much greater than carrot acreages.[12] In every county except Ayrshire there was an increase in the acreage during the period (see table 6:1).[13] It is difficult to pick out a pattern in fluctuations between counties. In 1870 cabbages were grown in only 11 parishes in Argyllshire, and covered small percentages of the land.[14] In Ayrshire, however, there were only 7 parishes in which they were not grown, and in Monkton they covered 0.35% of the arable and in Kilmarnock 0.23% (see map 6:1).[15] They were useful for feeding milk cows at the end of the season when the pasture was failing. All dairy farmers grew a few cabbages, and the best farmers allowed the crop considerable amounts of manure.[16] Cabbages had developed as a field crop since the 1830s. In Buteshire cabbages were grown in only two of the six parishes, covering just three quarters of an acre in the county.[17] In Dunbartonshire, however, they were grown in eight of the 12 parishes, the highest percentage being 0.26 in Dumbarton, while in Renfrewshire there was only Neilston in which cabbages were not grown.[18] In Paisley they covered 2.58% of the improved land and in Port Glasgow 1.37%. Perhaps they were produced for the urban markets. In Lanarkshire too cabbages were popular, and there were only 12 parishes in which they were not grown.[19] Most lowland parishes grew them, and in Rutherglen they covered 2.74% of the arable, in Govan 1.25% and in Glasgow Barony 1.10%. In Stirlingshire their popularity was less marked, being grown in small amounts (highest 0.26% of improved land in Campsie) in all but eight parishes.[20]

The concentration of cabbage-growing into industrial Lanarkshire and Renfrewshire would suggest that the crop was grown for local markets, ie. for human consumption. This is borne out by the fact that

MAP 6:1

CABBAGES AS PERCENTAGE IMPROVED LAND 1870

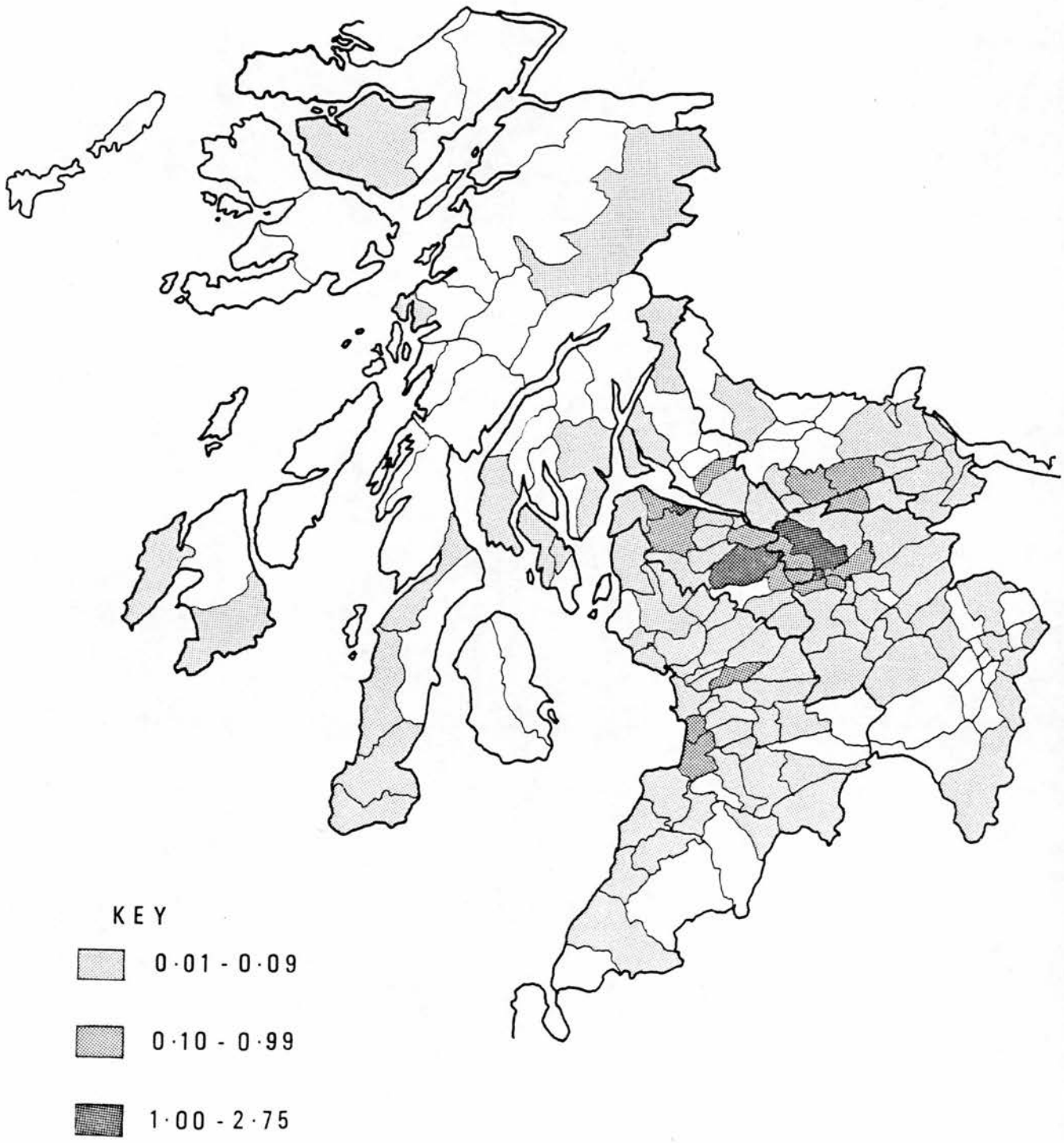


Table 6:1

CABBAGE ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	23¼	460¼	10	31¾	239½	41	37¼
1855	27½	263¾	9¾	35¼	275	49½	35¼
1856	49¾	339¾	13¼	34¾	251	96¾	44
1857	40¼	482¾	11¼	43¼	264¼	94	50½
1866	139	254	10	46	318	52	65
1867	124	157	7	46	316	105	35
1868	32	221	2	27	345	82	48
1869	105	181	3	29	342	83	35
1870	29	170	0	34	295	59	41
1871	18	167	0	28	288	98	44
1872	89	307	51	45	556	136	62
1873	43	138	31	51	431	115	35
1874	69	191	28	69	484	162	58

the highest percentages were in Paisley, Port Glasgow, Govan, Glasgow Barony and Rutherglen. The more general pattern suggests that cabbages were also increasing in popularity as a stock food, since they were grown so widely and in sufficiently large quantities to make it unlikely that they were all for human consumption.

2. FLAX

Sinclair considered flax to be of little importance in the best-managed districts, but pointed out that it was extensively cultivated in some areas.[1] It was the raw material of the linen industry, and the oil from its seed was useful as a cash crop, but it was also raised for domestic spinning needs.[2] The crop required deep friable loams, and there were large areas of Scotland well-suited to its growth.[3] It was easy to grow, but considerable attention was needed in its preparation and it required large amounts of manure even on the best land.[4] Land which was to be used for flax was to be ploughed early, and left for breaking by frost before the sowing of the seed broadcast in April.[5] In wheat-growing areas flax was unpopular for both crops were thought to exhaust the ground, although in fact flax was not exhausting provided it was pulled green.[6] Flax was grown with sown grasses, as a first or second crop after ley, or after barley or potatoes.[7] It tended not to be grown in the better areas where food crops made more rational use of land and labour, but could be found on low uplands and haugh land. It was grown over wide areas but in small amounts.[8]

In Argyllshire in 1813 flax was grown everywhere for family use, but only £3000-worth was exported annually and this came chiefly from Kintyre.[9] It was sown in April or May after potatoes or on other clean land.[10] Most of it was dressed at home after harvest, but there were mills in Kintyre and Lorn.[11] The climate and the rich, light dry land were well adapted to flax, and it could be worth £100 per acre in terms of finished cloth.[12] Flax was grown in many parishes in the 1790s.[13] In Lismore this was on a small scale, and in Kilfinan, although the ground was well-suited to it, little flax was grown

because of possible damage to the ground.[14] In Kilmalie there was very little flax, but in Gigha and Cara and Campbeltown much was raised and spun locally.[15] In Kilarrow and Kilmeny flax to the value of £2000 per annum was raised.[16] In Kilchonan it was grown by the common tenants and helped make up their rents, and yarn was a major export of the parish.[17] In the 1830s flax was mentioned only in Craignish and Tiree, but it was probably grown elsewhere too.[18]

In the 1790s in Ayrshire, flax was raised in several parishes.[19] In Beith the demands of the linen industry had caused it to be grown in large quantities, and in West Kilbride much attention was given to its growth and more flax was raised than elsewhere in the neighbourhood.[20] In Old Cumnock, its growth was recent, and it was produced only in amounts sufficient for family use.[21] In Galston, however, there was a water mill to dress flax, and consequently it was a relatively popular crop.[22] In Kirkoswald the soil was considered unsuitable for flax.[23] In the N.S.A. flax was mentioned only in Stevenston, Dalrymple (where it was raised for family use) and in Largs (where little was grown).[24] It was grown on Thornetown estate, Kilmaurs in 1836.[25] In 1866 Sturrock said that 30 years previously flax had been grown on nearly every farm for home use.[26] It may not have been considered sufficiently important to merit mention by many of the writers of the N.S.A. Dalry, Beith and Kilbirnie grew it as a cash crop, and its culture survived there longer than in other parishes.[27] Sturrock stated that in 1863 there were c310 acres of flax in those three parishes, but hardly any elsewhere in the county.[28] Lord Eglinton had tried to foster its growth in 1853, but high grain prices during the Crimean War had spoiled the plan.[29] Falling grain prices since then had made flax a more viable proposition, but it involved

a lot of work.[30]

Flax was grown in Arran in 1794, but was not mentioned for Bute.[31] It was mentioned in only one parish of the O.S.A., Kilmorie (Arran) where there were 9 acres of flax compared with 1320 of oats and 18 of peas.[32] In the N.S.A. flax was listed among crops grown in the other Arran parish Kilbride, but was not mentioned in Kilmorie.[33] There was no reference to the crop in Bute or Cumbrae. There was no flax in Bute in 1854, but 121½ acres were raised in Arran.[34] In the following year, and in 1857 however, no flax was grown in the county, and in 1856 there was only half an acre.[35] The crop was not grown in Buteshire during the remainder of the period.[36]

In Dunbartonshire in 1794 flax was grown widely for domestic use, so that there were c300 acres in the county.[37] Only in Kirkintilloch and Cumbernauld was it raised for the market; it was grown as a lay-awal crop, and premiums had been obtained from the Trustees For Improvements.[38] The crop sold for a good price in Glasgow, and the left-over seed could be used as valuable cattle food.[39] Flax was mentioned in four parishes in the O.S.A. and there was much flax in Cumbernauld.[40] In 1809, however, the seed had been difficult to obtain, and flax began to decline in importance.[41] The profits of spinning had recently fallen, and this too had helped the crop to fall from favour.[42] In the 1830s, flax was mentioned only in Kirkintilloch and Cumbernauld, and even there it had declined.[43] In Kirkintilloch where flax was grown chiefly in the east end of the parish, it was considered to be worth £5-6 per acre, but hay was worth as much, and potatoes and wheat worth considerably more.[44] In Cumbernauld flax had recently failed and its culture had been virtually abandoned.[45]

In Lanarkshire in 1794 flax was sown in small amounts throughout the county, and in larger amounts in Carnwath and in East and West Monkland.[46] In the O.S.A. flax was said to be sown only for domestic use, but in West Monkland much of it was raised, generally on ground well-manured with dung or lime.[47] Its culture had increased in the last ten years.[48] In East Monkland similarly, much flax was raised for sale; it was sown after oats or peas or was taken in the second year after land was broken up from pasture.[49] In Culter more flax was raised than in the neighbourhood, and the soil was well suited to it.[50] In Stonehouse flax was not grown as a field crop.[51] In the 1830s flax continued to be grown in some parishes for family use, although in Dalserf it was unpopular because it was an uncertain crop on stiff clay.[52] In Stonehouse it was seldom raised, although formerly it had been grown by everyone for family use.[53] Even in Old Monkland its culture had virtually ceased, and in New Monkland a clue to the reason for this was given.[54] During the war the price had been high and 500-800 acres of flax were cultivated in the parish. In the 1830s however, the price had fallen so much that no profit could be made from the crop. Lease covenants may have played some part in its lack of popularity. An undated lease for Dalziel restricted the tenant to growing only enough flax for his own use, and one of 1852 for East Kilbride forbade the tenant to plant flax.[55]

In Renfrewshire in the 1790s flax was mentioned only in Erskine, Paisley Abbey (little was cultivated) and in Lochwinnoch where it was very successful.[56] In 1812 flax was grown in Lochwinnoch and Kilbarchan, but its growth was not spreading from there.[57] Flax was not mentioned at all in the N.S.A. for Renfrewshire.

In Stirlinghsire in 1796 small quantities of flax were grown almost everywhere, and returns were good even in exposed situations.

It was grown by day-labourers and servants on land which had been prepared by the farmers, and was particularly well suited to the area south of Falkirk.[58] In the O.S.A. it was mentioned in several parishes.[59] It was grown after potatoes in Fintry and succeeded well.[60] In Slamannan strong flax was produced although it was poor in quality, so only sufficient was grown for home use, but in Larbert there were 50 acres.[61] In 1812 flax continued to be grown for home use, but the seed was expensive, and the crop was thought to be an exhausting one.[62] In the 1830s it was grown in Denny, but in Dunipace had been superceded by wheat.[63] In Slamannan considerable amounts were still grown, but flax had declined because it was felt that over-liming of the ground had caused the quality of the crop to decrease, although even in the 1790s this was not reputed to be good.[64]

In the 1850s flax was still grown in every county, and in considerable quantities in Lanarkshire and Stirlingshire.[65] Its growth decreased until 1857, and in some cases the decline was very marked (see table 6:2). By 1866 the decline had continued in four counties, but in the other three a recovery had been made.[66] For the remainder of the period the general trend was a downward one, but in individual cases, periodic recoveries did occur. In 1870 the one acre of flax in Argyllshire was found in two parishes, Killean and Kilcalmonell (see map 6:2).[67] In Ayrshire flax was grown in six parishes, the highest percentage of improved land covered being 0.56% in Beith, where the linen industry had encouraged its growth in the 1790s.[68] Perhaps inertia was responsible for its continued cultivation at this date. In Buteshire there was no flax grown, but in Dunbartonshire it was still found in Cumbernauld (1.87% of improved land) and Kirkintilloch (0.15%).[69] Flax was grown in ten parishes in Lanarkshire, and New

MAP 6:2

FLAX AS PERCENTAGE IMPROVED LAND 1870

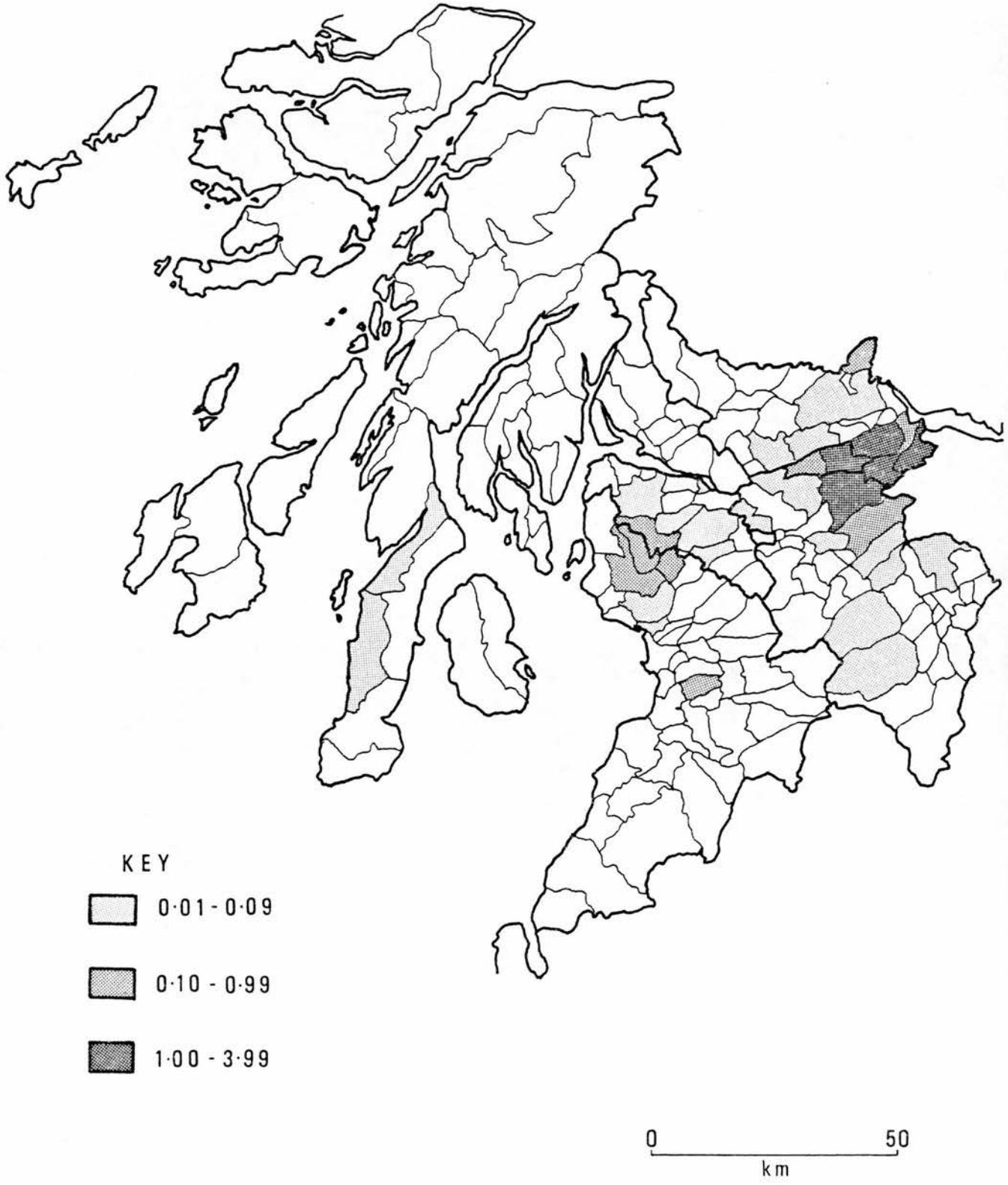


Table 6:2

FLAX ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	26½	404¾	12½	725½	1275¾	74¾	1372¾
1855	14½	69	0	432½	746¼	43¾	770½
1856	12¾	17¼	½	352¾	540½	16¼	548¾
1857	12¼	10½	0	210¼	309	8¾	438
1866		NO FLAX CATEGORY					
1867		NO FLAX CATEGORY					
1868	3	112	0	122	270	30	509
1869	4	110	0	100	252	7	423
1870	1	114	0	120	302	18	444
1871	0	123	0	99	278	33	396
1872	0	159	0	118	273	22	507
1873	0	79	0	60	192	7	338
1874	0	18	0	32	63	3	129

Monkland retained pre-eminance with 2.16% of improved land under the crop.[70] In Renfrewshire too the old flax-growing parish of Lochwinnoch had the largest percentage of land under the crop (0.13%) although flax was also grown in five other parishes.[71] Eight parishes in Stirlingshire raised flax, the highest percentage of improved land covered being 3.61% in Falkirk and 2.06% in Bothkennar.[72] Once again these areas had been well known for flax in the 1790s.

Despite changing circumstances, flax continued to be grown as a field crop, covering small percentages of the land, in several parishes which in the 1790s had concentrated on its growth. It was not, however, of major importance, and was not the fibre which formed the basis of the expanding textile industry. Flax growing appears to have become rather anachronistic by the end of the period.

In the 1790s flax cultivation may be seen at two levels; it was grown widely but in small quantities to supply domestic demands, and on a more extensive scale in certain parishes which specialised in its growth as a cash crop. By the early nineteenth century its growth had declined considerably. This was probably due to a fall in the price of the crop, a greater availability of imports after the Napoleonic Wars, a decline in domestic linen production, and a replacement of flax by other crops in the farming system.[73] Difficulties in obtaining seed, falling profits and possibly a falling off of returns had assisted in its decline. A major factor was that flax was sufficiently valuable to make freight a negligible item in costs, and little advantage was to be had from proximity to the market. It could best be grown in areas of cheap land, and since much work was needed in its preparation, in areas of cheap labour. It is for these reasons that flax played a declining role in British farming.[74] During the

nineteenth century the East European Plain became the chief source of supply for the Scottish linen industry.[75] Another important factor was the meteoric rise of the cotton industry in the Glasgow area from the 1780s onwards. Cotton and linen were rival fabrics for the same market and in a very short space of time the linen industry in the west of Scotland had been almost entirely supplanted by cotton.[76] By the 1830s flax cultivation was of little importance, and in many areas it had ceased altogether.[77] Nevertheless considerable acreages were still found in the 1850s but these may have been unusually high as a result of problems of obtaining flax during the Crimean War.[78] The most important flax-growing counties were Fife, Stirling and Lanark and this situation continued in 1868.[79] By 1874, three quarters of Scotland's flax crop was grown in Lanark and Stirling.[80]

3. LEGUMES

Legumes (Leguminosae) are extremely valuable in restoring fertility to worn out land, because their roots contain nitrogen-fixing bacteria which bring nitrogen from the atmosphere into the soil, thereby increasing its richness in this vital plant nutrient. The theory of nitrogen-fixing bacteria (Bacillus radicocola) was not discovered until the 1840s, but the value of legumes was recognised long before that.[1] Clover seed was used in seventeenth-century England and legumes had been grown in Scotland at that time.[2] Their advantages had probably been discovered by accident and then exploited by farmers who realised they were "good for the soil".[3]

Peas and beans will be discussed here, and clover (the other important leguminous crop) will be dealt with in conjunction with the other pasture grasses with which it was grown. Beans and peas will be considered together as they were often grown as a mixed crop, and were mentioned in conjunction in the source material.

Beans

Traditionally beans had been grown in the rich clays and strong loams to which they were well-suited,[4] but by the early nineteenth century they were also found on lighter land.[5] They were more successful than peas in moist weather. Beans had been sown broadcast, but as this encouraged the growth of weeds, drilling was preferred.[6] Beans were a precarious and troublesome crop; in hot summers they were subject to attack by the fly (the collier) for which there was no known cure.[7] Beans were also subject to heavy damage by frosts in March and April, which might result in the crop being ploughed in.[8] Beans were, however, of great value because they could limit the need for summer fallow to

once every six or eight years.[9] The horse bean was the most common type, but all varieties of beans were late ripeners although they needed early sowing.[10] Ground intended for beans had to be ploughed deeply after harvest, then ploughed twice in spring before the seed was sown in February or March.[11] The crop was then harrowed and hoed in.[12]

Peas

These were sown on light soils too shallow for beans, but in the early nineteenth century, "clean pease" had fallen into disfavour as a field crop because they were unprofitable and were thought to harm the ground.[13] This was really due to the weeds which grew with the peas when sown broadcast.[14] The crop did best in dry conditions, and August rains had been blamed for their failure.[15] This encouraged the growth of the straw but prevented the pods ripening.[16] The value of peas lay in their being legumes, but here beans or clover could serve equally well. Peas were nevertheless frequently sown in drills along with beans.[17] The bean stalks helped to prop up the peas,[18] and by using the two crops which favoured different conditions partial success at least could be ensured whether the weather was wet or dry.[19]

There were two types of peas, white and grey, although the former was a garden crop.[20] There were two species of grey peas, early and late ripeners (hot and cold seed).[21] Land intended for cold seed was ploughed in October/November, and the seed was planted in February/March, while that for hot seed was ploughed immediately before sowing in April/May.[22] Cold seed was best if corn was required, hot seed if straw was wanted.[23] The ground was hand-hoed while the crop was growing.[24]

Argyllshire

In 1794 beans were raised in fertile Lismore, on the Breadalbane estate, in Campbeltown and in Kintyre generally where they had been found to do well on light soils.[25] In the Hebrides beans were a late crop, but thrived in moist, clean ground and gave good grain and straw. The fields of peas which existed were very poor. Beans and peas were recommended for sowing together.[26] In Kilmaden peas were raised, and in Saddell and Skipness peas and beans were important crops.[27] In Muckairn, Kilfinan and Ardnamurchan a few peas were sown, and in Campbeltown beans were planted and occasionally a few peas too.[28] In Kilcalmonnel and Kilberry just a few beans were raised.[29] Small amounts of peas and beans were grown in Killean and Kilchenzie but since they did well, an increase was expected.[30] In Jura and Colonsay, Tiree and Kilbrandon and Kilchattan peas were not used, but it was thought that they might be introduced with advantage.[31]

In 1812 it was stated that beans were not extensively cultivated except in Kintyre.[32] They were sown on poor oat stubble, ploughed down and harrowed in.[33] Peas on the other hand were widely sown in small quantities and were sometimes used with beans.[34] The ploughing down of peas in full bloom was recommended on run-down soils.[35] By the 1830s beans and peas were both mentioned in Kilchonan, Killean and S. Knapdale.[36] The only other mention of either crop was the 'abundant beans' raised in Southend, although the soil in the east of the parish was too light for them.[37]

In the 1850s the bean acreage was five or six times that of peas (see tables 6:3 and 6:4). It rose from 1854 to 1855, fell in 1856 and rose again in 1857.[38] The pea acreage showed exactly the opposite trend. By 1866 the bean acreage had fallen slightly, and never again

reached such a high figure.[39] Minor fluctuations occured, but the trend was a downward one. In the case of peas, there had been a marked fall by 1866, and with very minor fluctuations the acreage remained low. From 1866-1874 beans occupied about 20 times as much land as did peas, despite the decrease in the acreage of beans. In 1870 beans were grown in about three-quarters of the Argyllshire parishes, but in none of them did they occupy a high percentage of land (see map 6:3 and 6:4).[40] The highest figures were 1.34 in Gigha and Cara, 1.34 in Campbeltown and 1.41 in Kilbrandon. Peas were grown in only nine parishes, and here the highest percentage of land covered was 0.09 in Inveraray.

Ayrshire

In 1793 beans were a common crop and did well especially on ley, although they had been rare until about 1770.[41] Beans and peas were frequently mixed and gave an excellent crop between oats and barley.[42] Peas alone were rarely used because they were hard to dry.[43] In Colmonell, however, peas were among the common crops, and in Kilmarnock the sowing of bere peas had been found to be the best way of bringing in weedy, or worn out ground.[44] The practice had been abandoned, but only because most such land had been successfully brought in.[45] Peas were grown in Ballantrae, Kirkmichael and Stair and were found in the rotations of Kirkoswald.[46] In Auchinleck, however, peas did not thrive, and in Muirkirk they ripened only in favourable seasons so were seldom sown.[47] In Dalry they were rarely grown because of the danger of flattening by autumn rains.[48] In Loudoun and Dailly few peas and no beans were sown.[49] Beans alone were not commonly grown, although they were important in Stevenston and Girvan

Table 6:3

BEAN ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	531½	3501¾	144¼	621½	3735¾	1438½	4545¼
1855	636½	3485¼	129½	715	3844¾	1585¾	4776¾
1856	601¾	3679½	128½	712¾	4010¼	1492¼	4967¾
1857	734½	3065¾	116¾	632	3097¾	1232¼	4680½
1866	579	1841	145	295	2096	722	3475
1867	564	1984	97	376	2105	831	3603
1868	382	1239	75	235	776	650	3473
1869	392	1318	70	308	1744	617	3459
1870	446	1390	99	323	1854	644	3255
1871	400	1660	101	375	1998	728	3582
1872	504	1891	88	441	2033	720	3710
1873	528	1843	113	507	2099	787	3750
1874	388	1722	122	478	2108	759	3830

Table 6:4

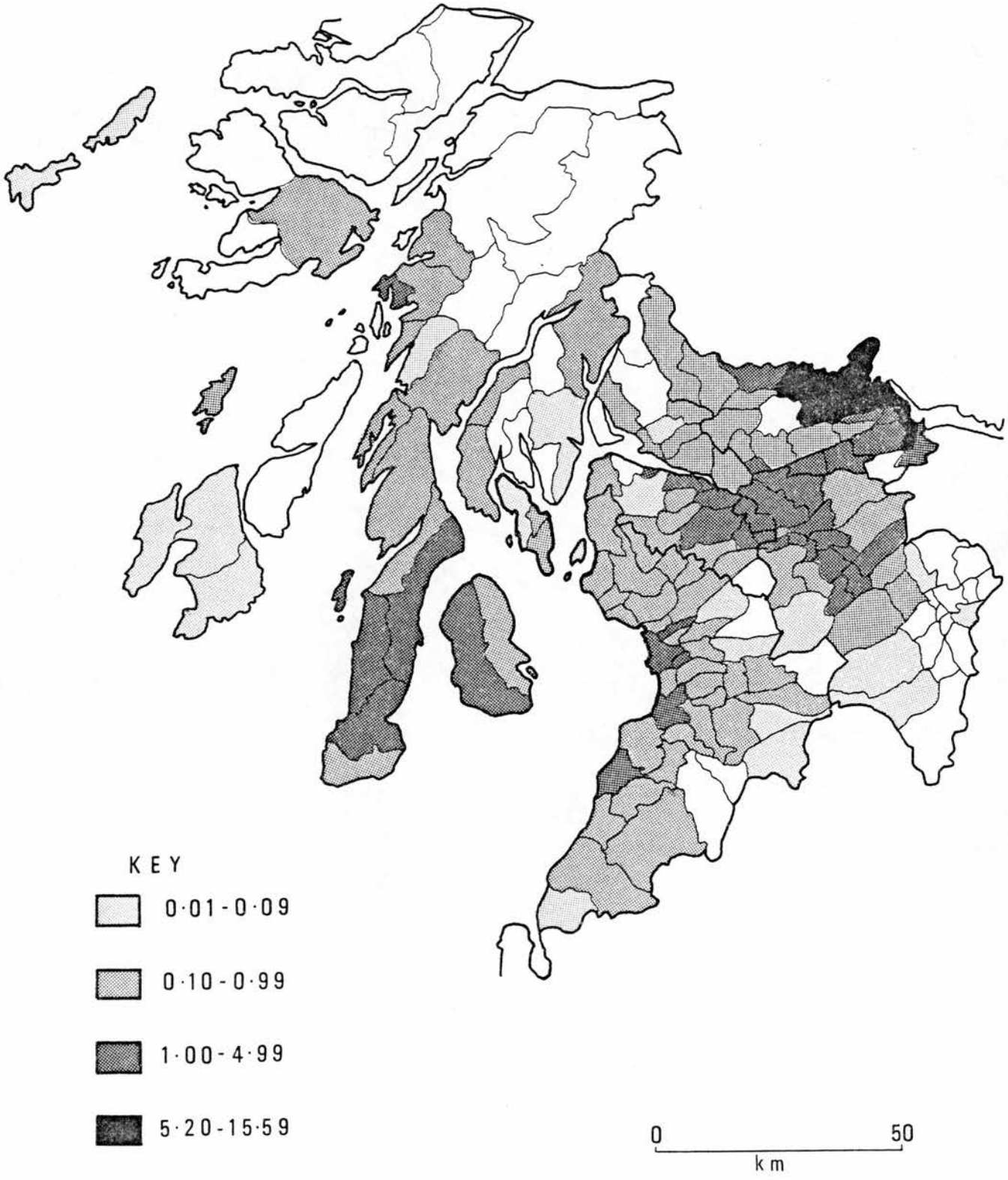
PEA ACREAGES

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	104	28¼	28¼	8¾	430	26½	30
1855	94	34¾	40¾	14	362	10¾	11¼
1856	117½	36	32¾	11¼	317¼	7	11½
1857	90	18	27¼	25¼	178¼	8½	2½
1866	18	21	36	2	151	13	58
1867	29	2	30	7	129	5	56
1868	17	10	5	2	46	8	37
1869	20	11	12	4	68	6	77
1870	20	10	17	6	105	11	73
1871	14	19	15	6	124	6	43
1872	13	19	2	9	100	4	6
1873	13	23	10	5	59	10	40
1874	18	9	7	3	31	5	38

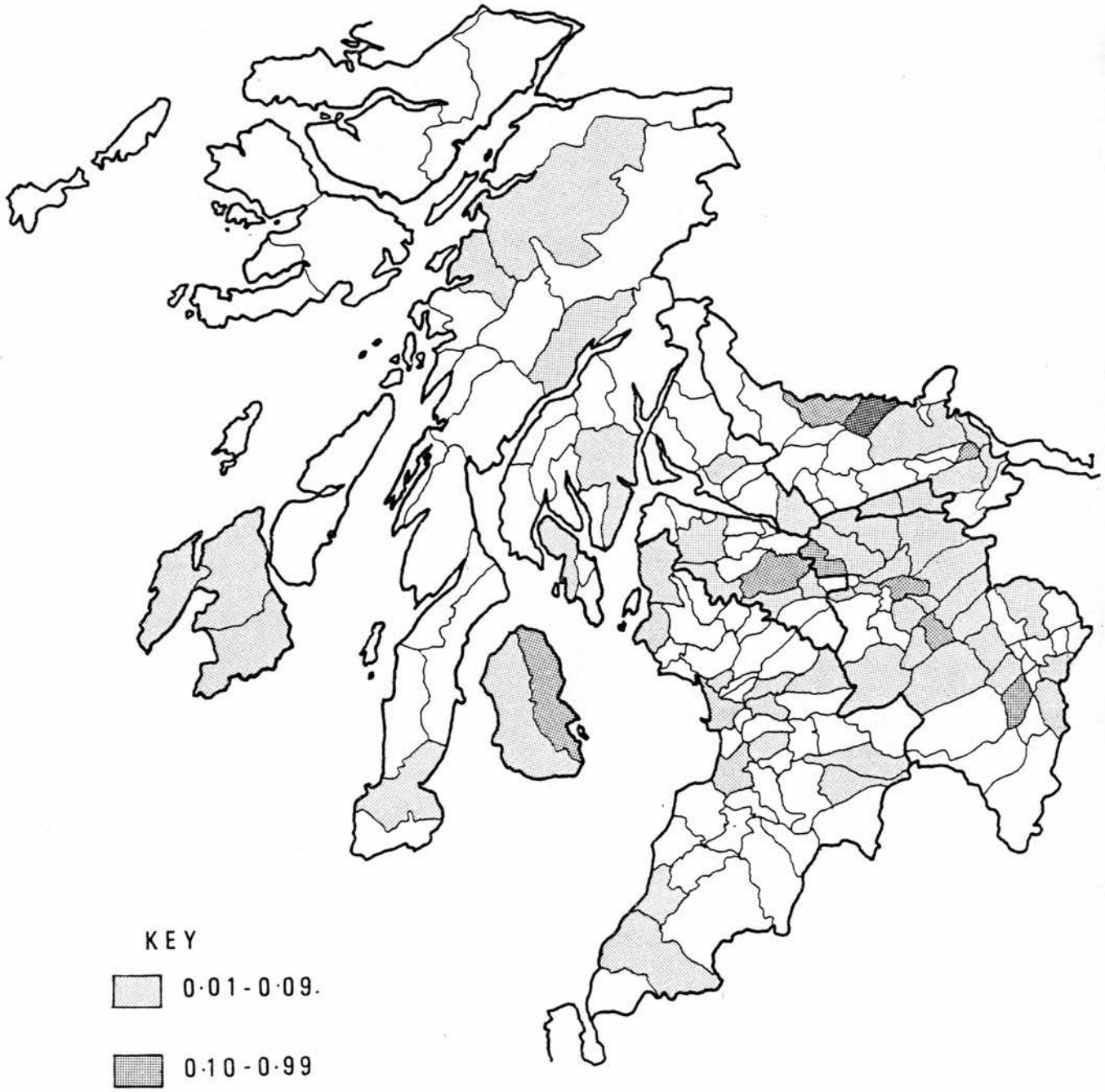
MAP 6:3

BEANS AS PERCENTAGE IMPROVED LAND 1870



MAP 6:4

PEAS AS PERCENTAGE IMPROVED LAND 1870



and small quantities were sown in Dalry.[50] In Kirkoswald beans and peas were grown, but were precarious, and in Symington and Kilmaurs they were sown in small amounts, while in Riccarton they could sometimes be profitable.[51] In Galston they did well and were recommended for planting between oat crops, but they were subject to damage by autumn rain.[52] In West Kilbride the soil was too light and the climate considered too hazardous for beans and peas, and in Beith too they were seldom sown.[53] In Craigie beans and peas were sown in early March, in Old Cumnock in March-April and in Ayr in April.[54]

In 1812 beans had recently increased in popularity, especially on clays and loams, despite the fact that the crop in 1806 had been lost as a result of blight.[55] Blane of Blanefield had succeeded in raising a good bean crop in 1810 by drilling and horse and hand-hoeing, despite the fact that many beans were lost in that year.[56] A few peas were sown broadcast with beans, although previously they had been sown alone or with oats (Mashlum); they did well on limed soil.[57] In Auchinleck in the 1830s beans had been recently introduced but were precarious.[58] In Craigie there were 128 acres of beans compared with 1426 of oats and 102 of potatoes, and in Kilbirnie 572 bolls of beans were raised compared with 4062 of oats and 240 of wheat.[59] Beans were grown in Dalry, Sorn , Stevenston and Kilmaurs, beans and peas in Old Cumnock, West Kilbride and for family use in Dalrymple.[60] In Kirkoswald beans were grown only on a few farms well adapted to them, and in Stair peas alone were mentioned.[61]

In the 1850s the bean acreage fluctuated in a way directly opposite to that of Argyllshire; it fell in 1855, rose in 1856 and fell again in 1857.[62] A more marked fall had occured by 1866, and the figure fell drastically by 1868, but had recovered again by the

end of the period.[63] The acreage of peas was always very small being only about one percent of the bean acreage. It rose slightly until 1856, but fell markedly from 1857, and after a partial recovery stood at a low level at the end of the period.[64] In the 1860s beans were sometimes substituted for an oat crop, and the sowing of mashlum was still practiced. Peas were rare as a separate crop.[65] In 1870 beans were grown in most parishes, although only covering small percentages of the land (see maps 6:3 and 6:4).[66] The highest percentages were 3.65 in Ayr, 1.37 in Dundonald and 1.27 in Symington. Peas were found in only 13 parishes, and the highest percentage of land covered was 0.06 in Largs. This is hardly surprising as the county total was only ten acres.

Buteshire

In 1794 beans were mentioned in neither Arran nor Bute, but peas were grown in Arran.[67] The only parish in which these crops were listed in the O.S.A. for Buteshire was Kilmory where peas were grown on a small scale (18 bolls sown compared with 1320 of oats and 330 of potatoes).[68] In 1807 in Arran mashlum and peas were included in rotations, and the peas were grown chiefly for the straw.[69] In the N.S.A. beans and peas were mentioned in both parishes in Arran, although they seem to have been excluded from the new rotation which had been introduced in Kilmory.[70] The crops were not referred to in the reports for the island of Bute.

By 1854 the unpopularity of beans and peas in Bute continued and of the 144¼ acres of beans in the county only 4½ were in Bute (see tables 6:3 and 6:4).[71] Similarly the 28¼ acres of peas were all in Arran.[72] The pattern continued until 1857.[73] From 1866 the acreages

were no longer listed separately for Arran and Bute. The total acreage of beans for 1866 had increased from 1857, and the figure fluctuated thereafter.[74] Similarly the acreage of peas had increased slightly between 1857 and 1866, but the figures concerned were much less than those for beans. They fluctuated too, but not in the same pattern as the beans. In 1870 beans were found in each of the parishes in Buteshire, except North Bute, but the largest percentage of improved land covered by them was 1.47 in Kilmory (see maps 6:3 and 6:4).[75] In only three parishes were peas grown; the two in Arran together with North Bute. The highest percentage of land occupied was 0.21 in Kilmory.

Dunbartonshire

In 1794 the growth of mashlum in small fields was declining, although it had been common.[76] Small amounts of beans and peas were raised in Cumbernauld, New Kilpatrick, Kirkintilloch and on the stronger soils in Cardross.[77] Peas alone were raised in Bonhill, Old Kilpatrick and Rhu, where they were sown in March to May.[78] In Luss 137 bolls of peas were raised compared with 2812 of oats and 376 of bere.[79]

By 1811 beans were more common than peas and were spreading, especially on to the stiff clays where they were an excellent preparation for wheat.[80] They were usually sown broadcast in February.[81] Peas were rarely sown although they might follow oats or wheat in dry ground with no manure.[82] They were sown broadcast in March to April, and hoeing was considered unnecessary because the peas smothered the weeds.[83] The sowing of beans and peas together was not recommended because of the unsuitability of any soil for both crops.[84]

In the 1830s in New Kilpatrick 110 quarters of beans were raised compared with 5675 of oats and 315 of barley.[85] Peas and beans were sown in Kirkintilloch, but were not mentioned elsewhere.[86] In 1854 there were 621½ acres of beans, and this rose in 1855, but fell thereafter (see tables 6:3 and 6:4).[87] By 1866 the total was more than halved, and with fluctuations remained at a fairly low level until 1873 when it reached 507 acres.[88] The acreage of peas was very small, the bean acreage being about 30 times as great.[89] The largest acreage was in 1857, but after that the total was always less than ten acres. In 1870 beans were grown in nine of the 12 parishes, but the highest percentages of land occupied were 1.57 in Kirkintilloch, 1.17 in Cumbernauld and 1.04 in New Kilpatrick (see maps 6:3 and 6:4).[90] Peas were grown in only four parishes, and the highest percentage of land covered was 0.06 in Bonhill.

Lanarkshire

In 1794 peas and beans were cultivated in the low ground, but they rarely succeeded high up because of climatic factors.[91] They were sometimes mixed, sometimes sown separately but were rarely drilled.[92] In Dalserf beans and peas thrived on land in good order, and due to the bad season of 1791, had succeeded better than barley.[93] They were also sown in Hamilton and gave good returns.[94] Peas were used alone on poor land, although recent bad seasons had discouraged their growth.[95] Beans were grown in Bothwell, and peas and beans in several parishes.[96] In Pettinain peas were sometimes sown on clay but were precarious, beans were seldom sown except on spots of rich clay.[97] In Shotts peas came between two corn crops, but in Lesmahagow they seldom did well, and there was only a small area suitable for beans.[98] In several par-

ishes a few peas were sown, but in Crawford, the most upland parish in the county, they had proved unsuccessful.[99] In Carnwath too the climate was considered to be unfavourable, and in Carmichael the late date of harvest discouraged their growth.[100] In Govan beans and peas were used only on the high ground where the soil tended towards clay.[101] In Covington peas accounted for 60 acres, compared with 90 of barley and 70 of root crops.[102]

By the 1830s beans and peas were still common and were raised in Bothwell, Dalziel, Old Monkland and on the lower grounds of Hamilton.[103] Horse beans and late grey peas were the preferred type. Beans alone were sown in Cadder and Lanark and peas in Biggar and Carmichael.[104] In Cambuslang in 1836 there were 250 acres of peas and beans compared with 238 in 1791.[105]

In 1854 there were 3735¾ acres of beans in the county and this rose until 1856 when it fell considerably (see tables 6:3 and 6:4).[106] By 1866 there had been another marked decline, and by 1868 the total stood at only 776 acres, but there was then a recovery, and the acreage increased steadily until the end of the period.[107] In 1854 the acreage of peas was fairly considerable (430 acres), but only about one ninth of that of beans.[108] It declined greatly in 1857 and by 1868 stood at only 46 acres.[109] It rose again until 1871, but by 1874 had fallen and was only about one eightieth of the bean acreage.[110] In 1870 beans were grown in all but 12 parishes, and covered 4.83% of the improved land in Bothwell and 3.20% in Blantyre (see maps 6:3 and 6:4).[111] There were 17 parishes in which peas were not sown, and the highest percentages of improved land covered were 0.49 in Dalserf and 0.19 in Govan.[112]

Renfrewshire

In 1794 beans and peas were used in rotations in Inchinnan and Portmauld.[113] Peas were produced on the hill farms of Houston and Kilallan, and peas and beans in the lowland ones.[114] In Kilbarchan beans had been used between two oat crops, but due to wet weather they had been abandoned.[115] Beans and peas were common in the rotations of Paisley Abbey.[116] In 1812 some beans and peas were grown, but only in small amounts and they had declined in importance because they were not thought to be as productive since the introduction of rye-grass and the use of lime as a manure.[117] In the N.S.A. beans and peas were not mentioned much. In Mearns they were grown, but to a lesser extent than formerly.[118] In the lower division of Paisley there were 440 acres of beans compared with 2750 of oats and 1320 of potatoes.[119]

Nevertheless in 1854 there were 1438½ acres of beans in the county and this rose in 1855 but in 1857 stood at only 1232¼ acres (see tables 6:3 and 6:4).[120] A substantial reduction had occured by 1866, but with fluctuations this figure was maintained at the end of the period.[121] Peas were much less common. There were only 26½ acres in 1854 (about one fiftieth of the bean acreage) and this fell thereafter, so that by 1874 there were only 5 acres (about a hundred and fiftieth of the bean acreage).[122] In 1870 there were only two parishes in which beans were not grown, but in Renfrew they accounted for 3.39% of the arable, in Inchinnan 3.27% and in Eastwood 2.66% (see maps 6:3 and 6:4).[123] Peas were grown in only six parishes, and the highest percentage of land covered was 0.49 in Paisley.[124]

Stirlingshire

In 1796 beans and peas were rarely grown in the higher areas because of the cold wet climate and changable weather.[125] In the carses, however, they formed a valuable part of the produce.[126] Beans were sown with peas in the ratio two to one or three to one.[127] Some beans had been successfully drilled, but the moist climate was blamed for the general failure of the practice.[128] Vetches or tares were sometimes mixed with beans and peas.[129] On loams in Killearn, good crops of peas could be had and in Kippen peas were sown on the dryfield land and beans on the carses.[130] Beans and peas together were sown in Alva, Bothkennar, Airth and Strathblane, and beans alone in Kilsyth.[131] In Campsie, beans and peas were unprofitable because the wet climate brought on the straw at the expense of the pods.[132] In Gargunnock beans were sown in February to March, but the soil of the dryfield was considered too weak for them.[133] Peas had sometimes succeeded, but generally they ran to straw.[134] Similarly in St. Ninians beans were confined to the carse land, but peas were used with them on the dryfield.[135]

In 1812 beans and peas were usually mixed especially on the carses.[136] They were sown with dung in February to March, but the climate was too precarious for them in the higher parts of the county.[137] Peas were one third or one quarter of the total and grew well with their tendrils round the beans.[138] In the dryfields of the west peas were sometimes sown alone but they were frequently lost in wet seasons.[139] Beans could be sown alone, drilled (as by a Mr. Walker of Falkirk), or broadcast as in the Carses of Gargunnock, Polmont and Larbert.[140] They were sown on the Airth estates from 1808-1816.[141] In the 1830s peas and beans were grown in Alva and

Denny, and beans alone were found in several parishes.[142] In Kippen beans were raised on the carseland but rarely on the dryfield.[143] They were also found on the carses of Stirling, and in Polmont.[144]

In 1854 there were 4545½ acres of beans, and the total rose until 1856 then fell slightly (see tables 6:3 and 6:4).[145] By 1866 it had fallen substantially, and continued to fall, but from 1871 experienced a gradual rise.[146] In 1854 there were only 30 acres of peas (approximately a hundred and fiftieth of the bean acreage) and the total fell to 2½ acres in 1857.[147] It had reached 58 acres in 1866 and fell until 1869 when it rose to 77 acres, only to decrease again.[148] By 1874 the pea acreage was one hundredth that of bean.[149] In 1870 beans were grown in all but two parishes, and in some accounted for high percentages of the land (see maps 6:3 and 6:4).[150] They occupied 15.55% of the arable in Airth and 14.19% in Bothkennar. Peas, however, were grown in only eight parishes, but they accounted for 1.48% of the acreage in Gargunnock.

CONCLUSION

Beans and peas were raised in varying amounts in all counties throughout the period. In the 1790s they were concentrated particularly into the lower areas, because on the high ground failure was more likely. In most parts of Argyllshire they were not really a suitable crop, and by c1810 seem to have declined, except for the occasional sowing of peas to enliven run-down soils. In Ayrshire and Dunbartonshire they were popular, and this increased into the nineteenth century, perhaps because of their usefulness in rotations for the enrichment of ground. In Buteshire, there was a contrast between the use of the crops in Arran and Bute, but they were relatively unimportant. In

Lanarkshire and Stirlingshire they were common on low ground, probably for the same reasons. In Renfrewshire, however, there is evidence of conflicting land use, and rye-grass seems to have been more popular than beans and peas and occupied the land which might otherwise have supported them.

The pattern during the 1850s and 60s is not a uniform one. The discrepancy in the acreage of beans and peas is striking (see tables 6:3 and 6:4). This bears out Kames' prediction that beans would be more popular because of their inherent climatic suitability.[151] In every county the general trend of beans was a downward one, and except for Stirlingshire this also applies to peas, although the trend does not always tie in with prices (see diagrams 6:5 to 6:11). In Stirlingshire the drop in beans was less marked, perhaps because of the presence of the carse clays for which beans were well suited. This is borne out by the highest bean acreage in 1870 being in carseland parishes. If this is so, however, it is difficult to explain why peas should have increased so markedly in the middle of the period. It may have been that peas began to be cultivated as a market garden crop. A possible explanation for the decline in the bean acreage is that the heavy soils to which they were best suited would have been laid down increasingly to permanent grass when foreign competition began to be felt. Also a decline in the grain acreage as a result of this competition could have caused a decline in the area under rotation, and this could have automatically resulted in a lessening of the acreage of beans and peas, which were grown largely for their value in rotations.

DIAGRAM 6:5

FIARS BEANS ARGYLL

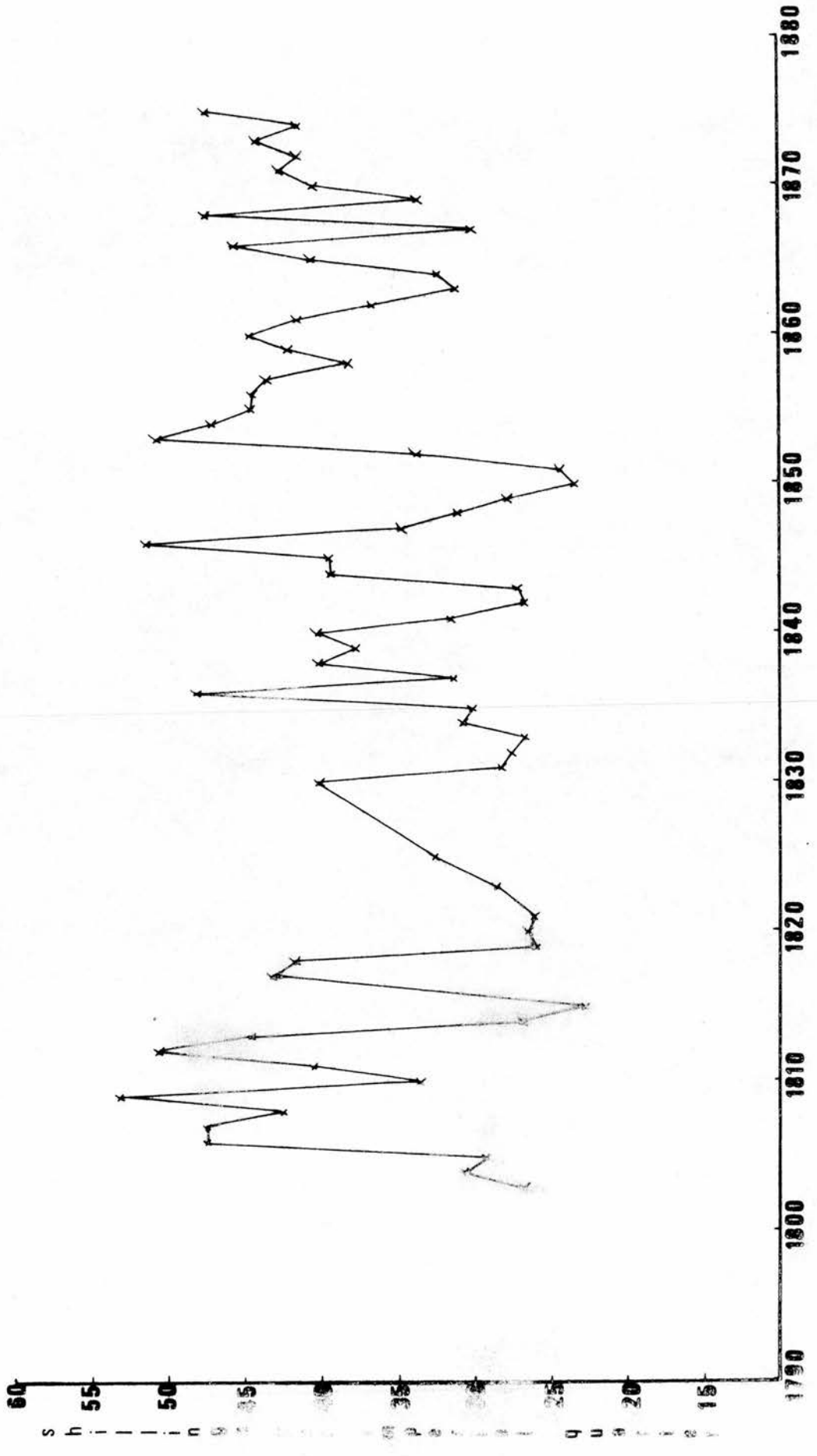


DIAGRAM 6:6

FIARS BEANS/PEAS AYR

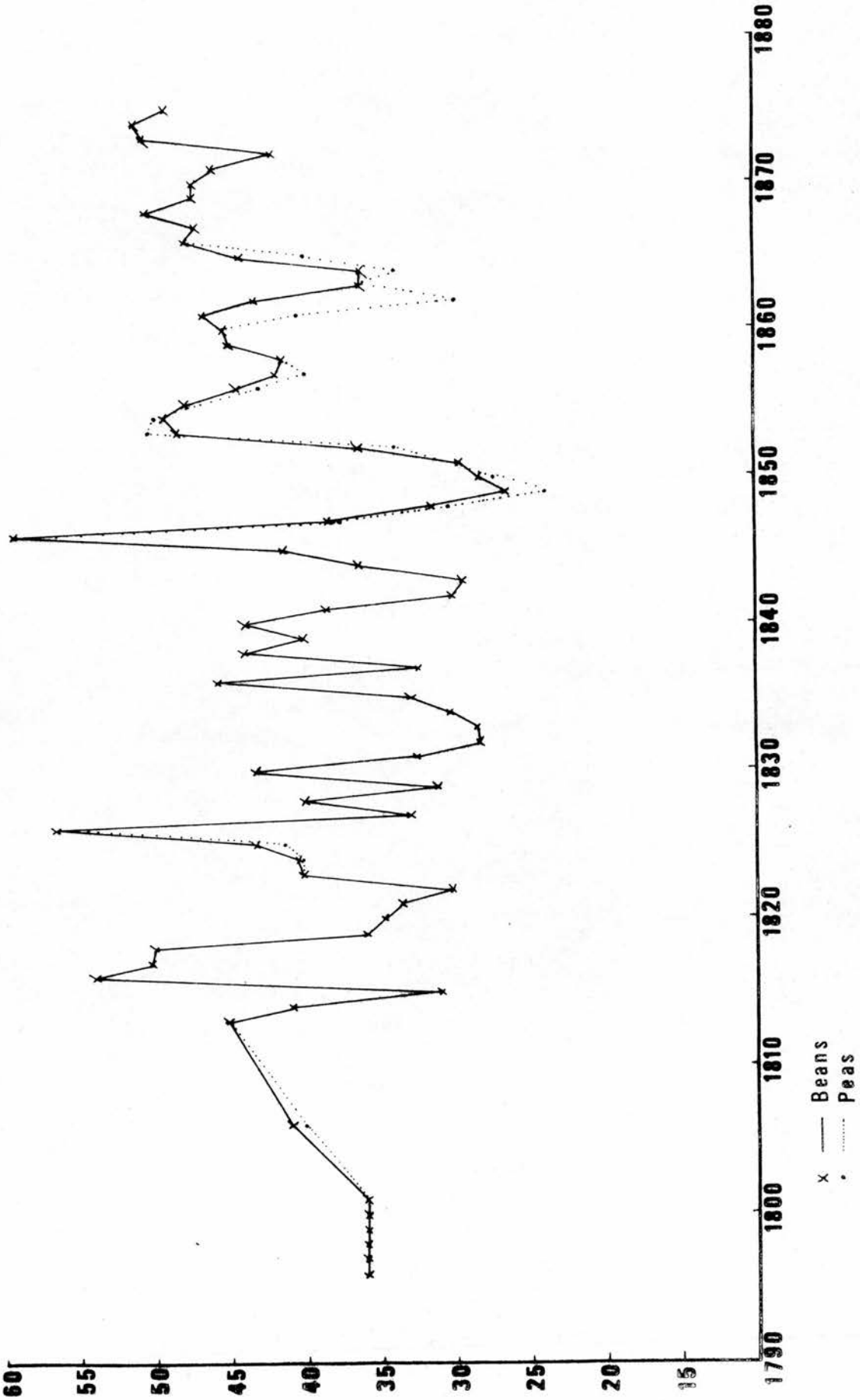


DIAGRAM 6:7

FIARS BEANS/PEAS BUTE

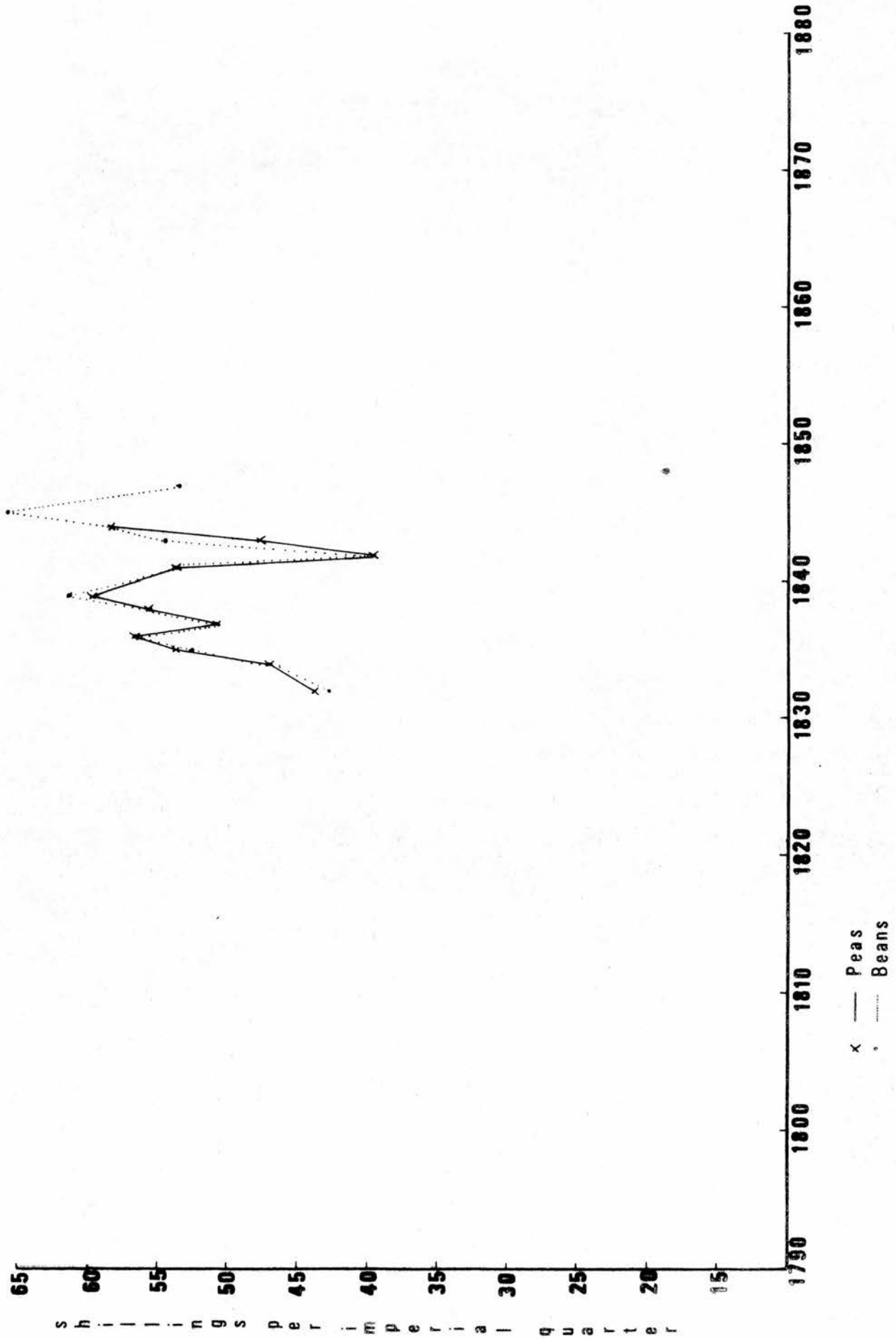


DIAGRAM 6:8

FIARS BEANS/PEAS DUNBARTON

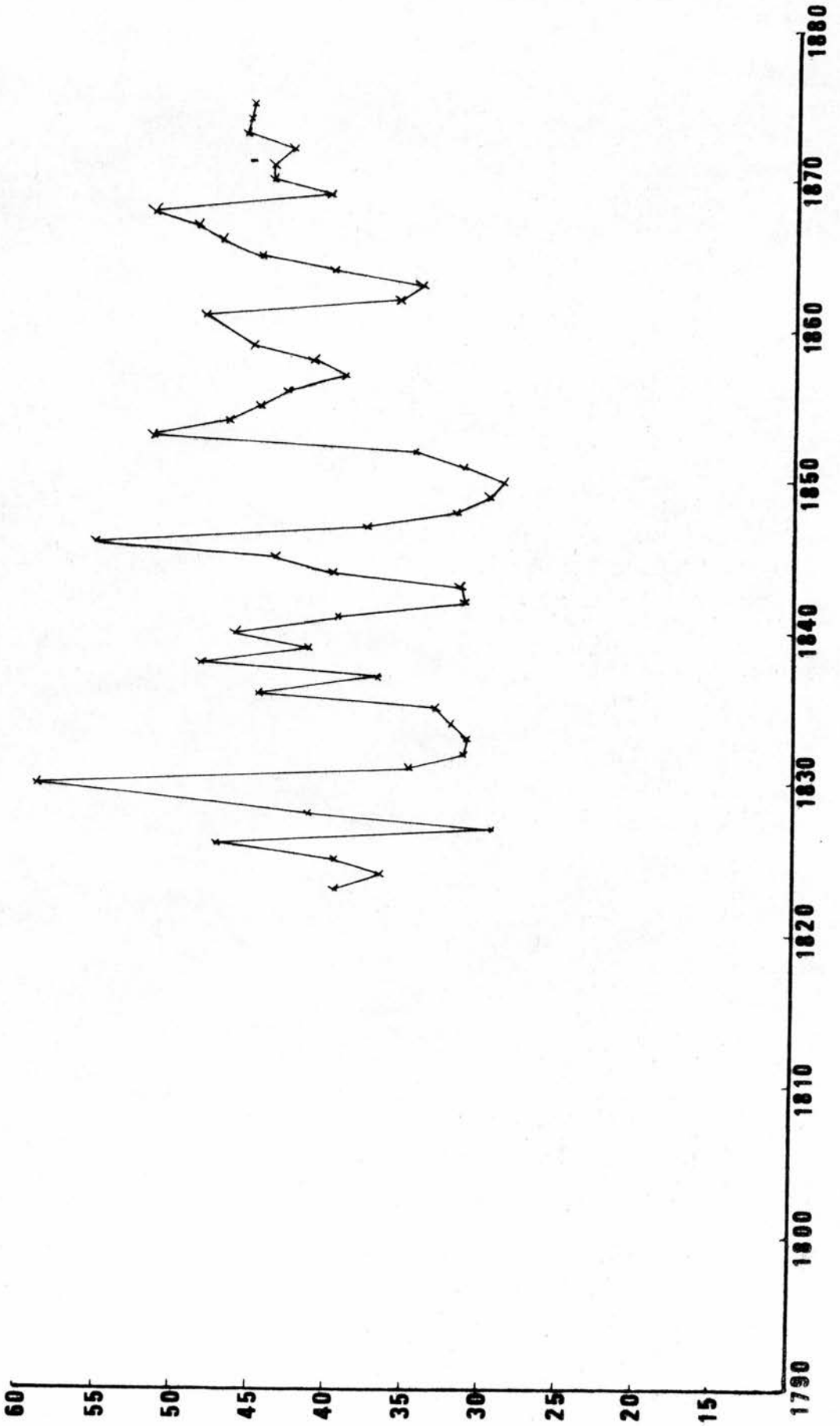


DIAGRAM 6:9

FIARS BEANS/PEAS LANARK

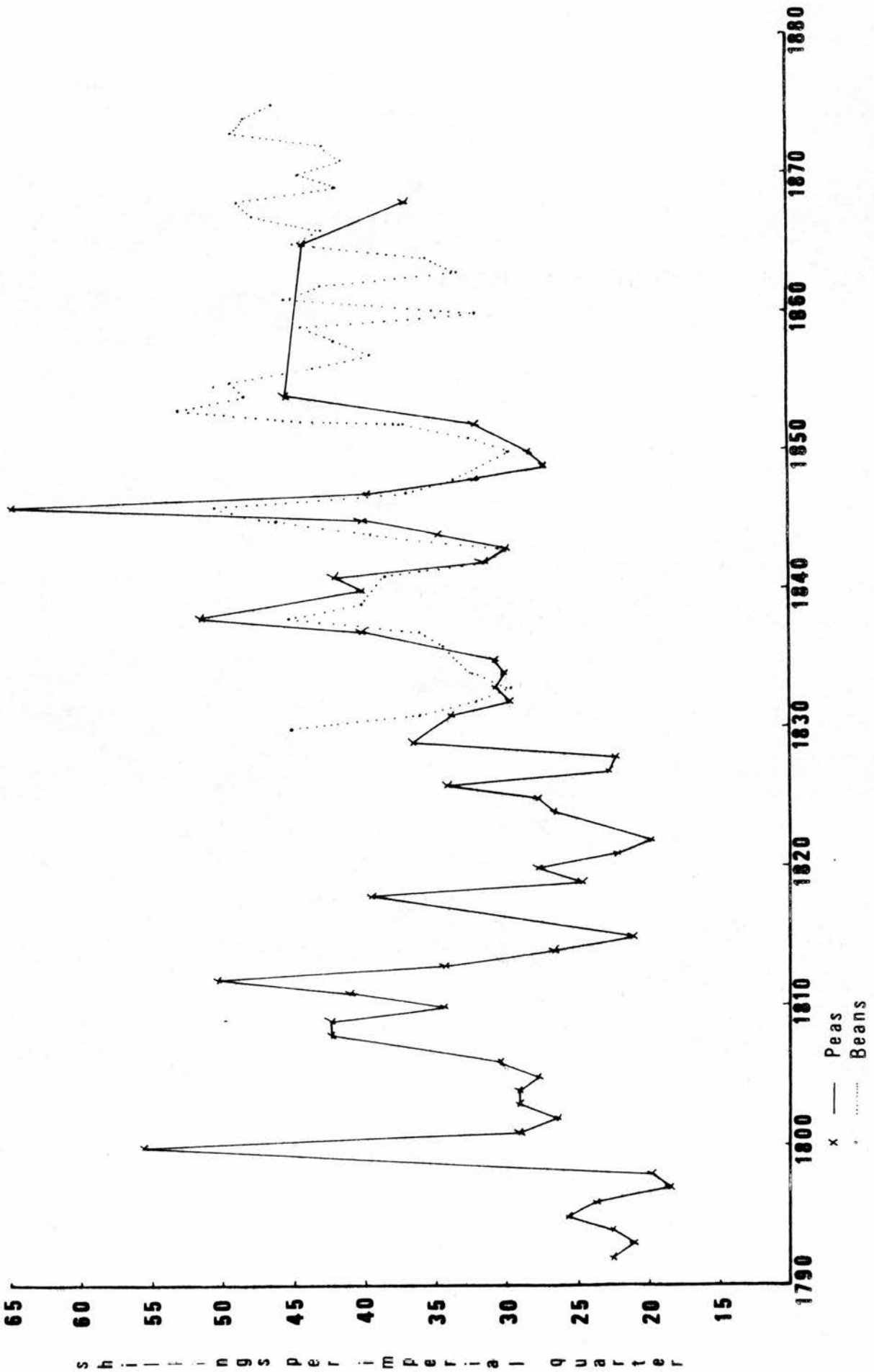


DIAGRAM 6:10

FIARS BEANS/PEAS RENFREW

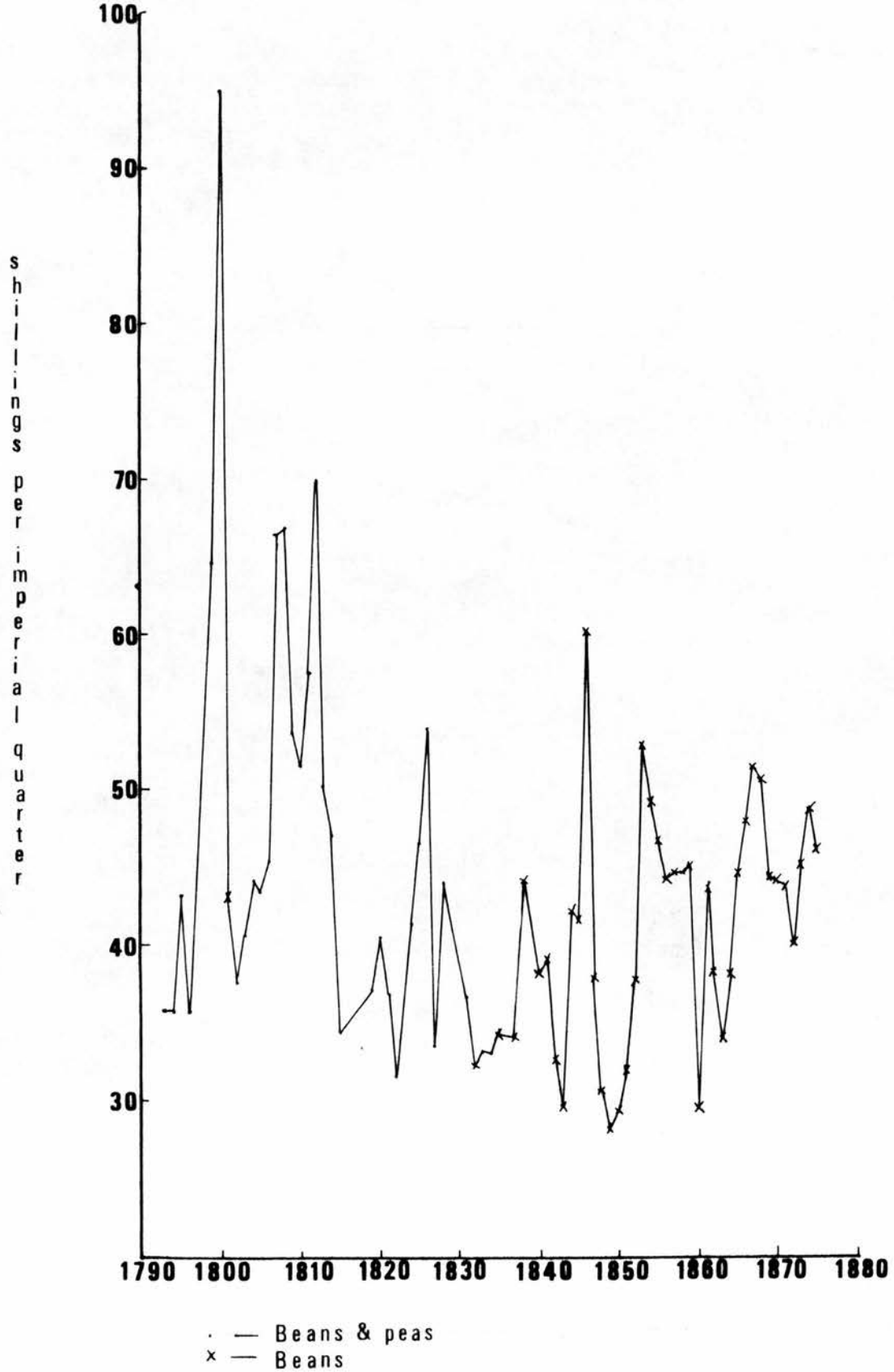
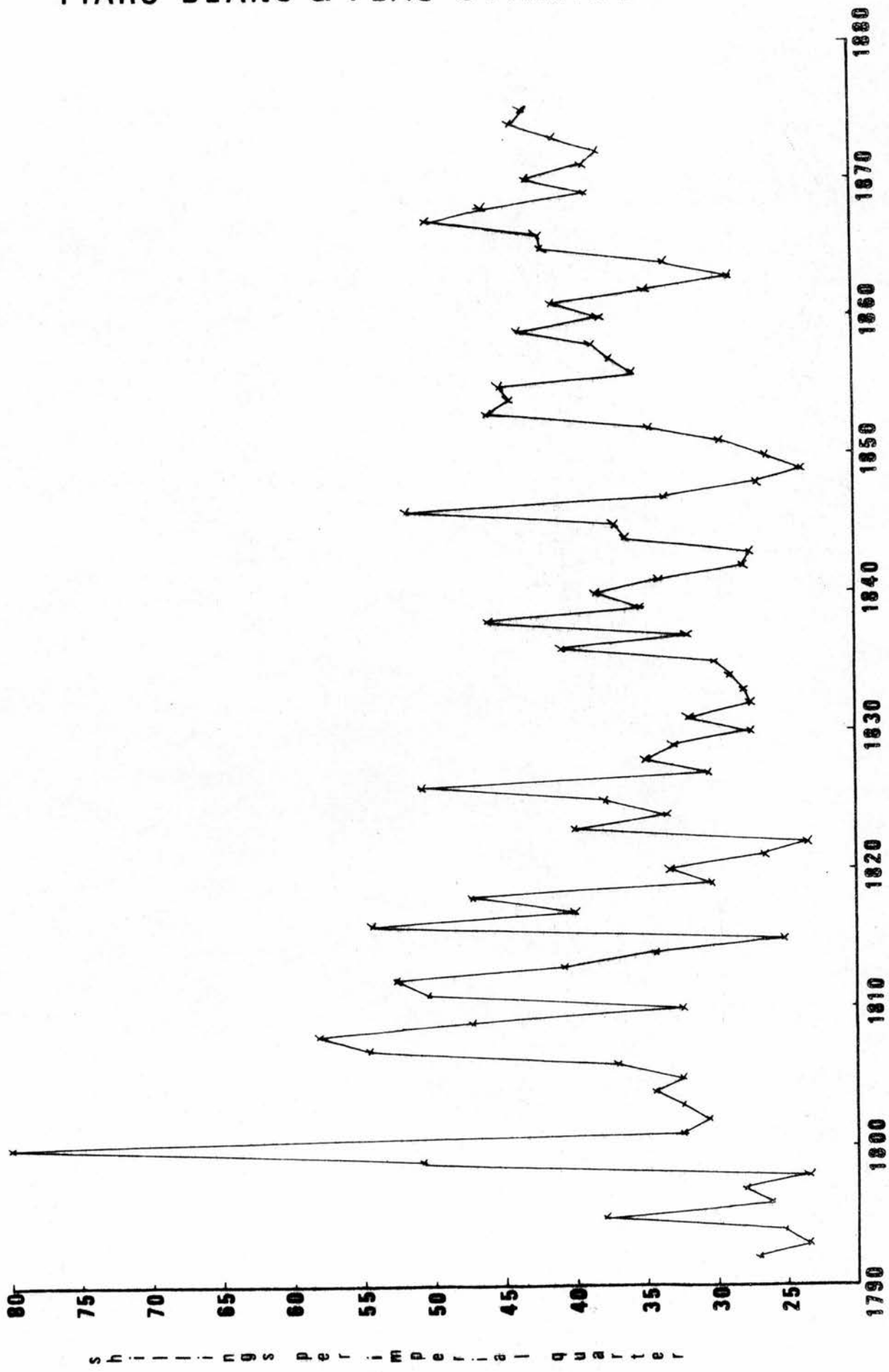


DIAGRAM 6:11

FIARS BEANS & PEAS STIRLING



Chapter 7

GRASSLAND

Grassland has always played an important part in British farming; indeed it would be injurious to most land if it were kept constantly under crop. Grass might be used as part of a rotation, or land could be kept permanently under grass. In either of these cases it could be left for pasture or cut for hay. Various types of grassland will be dealt with individually and their role in the farming system considered.

1. PERMANENT PASTURE

a) Upland Pastures

Large areas of moorland in Scotland have always been under pasture.[1] Sometimes ploughing had been attempted there (this is shown by the remains of cultivation ridges well above the limits of cultivation which are reached today), but due to altitude, steep slopes and poor soils it had been abandoned.[2] These areas revert naturally to pasture, but in the early nineteenth century, some such areas had been much improved by the construction of surface drains in waterlogged areas.[3] Such pastures were used mainly as sheep, and occasionally, cattle walks, and the chief problem lay in the provision of sufficient winter fodder.[4] Sinclair recommended that a small sheltered area of the farm be set aside and put under rotation, and that the best grasses be grown there for hay, and turnips for winter fodder.[5]

b) Lowland Pastures

The practice of leaving under grass, land capable of cultivation was an English rather than a Scottish one.[6] Such pastures were reputed to be very productive, and indeed in Scotland haugh land was often enclosed for natural hay, but for the most part convertible husbandry was felt to be a more beneficial use of the land.[7] Nevertheless, in some areas the English practice had been imitated, perhaps in the few places where vale land was found.[8] Sinclair suggested that many such pastures should be broken up, and quoted examples of vast increases in rent made possible by the breaking up of such land for crops.[9] Care was necessary in selecting a rotation to suit the soil (see Rotations), and in destroying grubs by use of lime.[10]

2. ROTATION GRASSLAND

No matter how carefully land under crops was managed, before the use of modern chemical fertilizers, eventually it became unproductive.[11] One method of restoring or maintaining fertility is to allow the land to lie in grass for a certain length of time. In primitive farming systems, the land was cropped until it became exhausted, then rested for a fairly long period. In a well-managed farming system, short intervals of pasture are allowed to come between crops before the land is exhausted.[12] Both crop and pasture are valuable components of the system. The relative length of pasture and crops and the particular rotation which should be used depends upon local conditions; climate, soil fertility, cropping patterns etc. In order to assist the process of grassing, and to encourage a heavy cover, in eighteenth-century Scotland, grass seeds were usually sown down with the last crop.[13] The grass could then be cut for hay, mown for use in its green state

or pastured by stock (especially if the grass was fairly scanty).[14] Sinclair felt that even permanent pastures benefited from occasional breaking-up, and recommended this for the moist West of Scotland, which was well suited to grass.[15]

3. MEADOWS

Meadows are sections of damp or marshy land used for the cultivation of hay. They were invaluable in the traditional agricultural system, for the hay which they provided sustained the stock during the winter.[16] All land which was marshy or could be made so, could be converted to meadow and thus produce an abundant if coarse plant growth.[17] Animals were prevented from pasturing meadows in summer (a practice known as Haining) in order that a better hay crop could be obtained.[18] Meadows became less valuable when artificial grasses were introduced, and many of them were drained and ploughed up.[19] In pastoral areas, however, they were often maintained to produce winter fodder.[20]

THE SOWING OF GRASSES

Sown or artificial grasses played a vital part in the improved farming systems, particularly in the practice of convertible husbandry. The chief grasses used for hay, pasture and for cutting as cattle food were the clovers (red, white and yellow) rye-grass and rib-wart.[21] They were sown in spring with the first grain crop after fallow or turnips.[22] If winter-wheat was used they were sown while the crop grew, or if spring-sown the grasses were put down immediately after

the grain.[23] The type of grass sown depended upon the soil, whether the crop was intended for short ley, lengthy pasture or permanent pasture.[24] If intended only for one or two years pasture, half to three-quarters of a bushel of rye-grass plus 10-12 pounds of clover (chiefly red) were considered best, if intended for longer pasture the mixture was one bushel perennial rye-grass, plus eight pounds white clover (longer lasting than red), six pounds red clover, two pounds trefoil and one pound ribgrass.[25] When the appropriate proportions had been selected, the seeds were mixed and then sown broadcast.[26] Grassland required no particular care, other than the gathering of weeds, removing of stones and spreading of mole-hills.[27] The main problem was the danger of suffocation of the grass by the grain crop or of its uprooting by frosts.[28]

Rye-Grass

Perennial rye-grass (Lolium perenne) was the most popular type because of its long-lasting qualities, although if only one year's grass was required, the annual type could be used.[29] The problem was that it was difficult to distinguish between the two types, so farmers were enjoined to obtain their supplies from a reliable source.[30] Rye-grass succeeded best on rich loams and clays, and although it could be grown on poorer land, was likely to die out after a few years.[31]

Italian rye-grass (Lolium italicum) was introduced to Britain in the 1830s, and because of its ability to produce bulk in the first year of growth, became the basis of one-year mixtures.[32]

Clover

Red clover (Trifolium protense) is a biennial, but will last for

three years if cut green.[33] It is best suited to well-drained clay loams rich in humus and lime,[34] but will grow on well-cultivated moor.[35] Only on a wet soil did it not thrive.[36] White clover (Trifolium repens) is longer-lasting than red, and being a 'creeping plant' provides a strong bottom layer in pastures.[37] It grows on all soils, and its culture is similar to that of red clover, as is that of yellow clover and of ribwort.[38]

Various natural grasses were found in pasture land, and grew with the artificial ones.[39] They helped to provide a heavier mat of grass and a more mixed assemblage of species.

The Use of Artifical Grasses

If the crop was intended for hay, mowing was done when it had ripened.[40] The benefits of hay for stall-feeding horses and for keeping dairy cattle out of the fly-infested fields were fully realised.[41] Soiling, the practice of feeding stock on cut green forage,[42] also began to be practiced and numerous advantages were found in this.[43] In particular the subsequent corn crop was found to be better on land from which grass had been cut twice.[44] Sinclair recognised that some soils were unsuited to soiling, and that they could be better employed in pasture.[45]

The role of grassland in the study area will now be considered.

ARGYLLSHIRE

In 1794 the area from Tyndrum to Fort William (Inverness-shire) was devoted to sheep grazing, and we may infer that the grazings were in a relatively unimproved state.[46] The coarse valley grasses were vital for winter fodder, although the mountain tops were sufficient

for summer grazing.[47] At Achtrichton, Glencoe, the grazing was good, and dairy cattle were supported.[48] In Lismore only the minister had experimented with clover, but in Kerrara shell sand was used to produce good-quality pasture.[49] In Glencoe shell sand had been found to be very successful for hay, and the returns were four to five times those obtained previously.[50] This was a boon to dairy farmers.[51] Near Campbeltown a little clover had been tried, and did well, but no grasses were sown when land was put down to pasture.[52] In the Inverary area the land was chiefly pasture, but little of it was cultivated by the tenants.[53]

In many parishes in the 1790s artificial grasses had already become important. In Kilbrandon and Kilchattan they did well; red and white clover were natives and grew abundantly on soil rich in lime and shell sand.[54] In Glassary they were well used by all the large proprietors; in Colonsay they had done well.[55] Clover and rye-grass were grown in Kilmadan and a little was found in Kilmalie.[56] In other parishes they were only beginning to become popular. Gentlemen in Lismore and Ardchattan had tried rye-grass and clover with good results.[57] In Kilmartin, Kilcalmonell and Craignish only one proprietor sowed grass seed, although the returns had been encouraging.[58] In Ardnamurchan little was sown, in Campbeltown there was little hay and in Jura artificial grasses had not been tried.[59] There was much natural grass, including meadow, in Glenorchy, but only a little artificial grass, and although Lochgoilhead was a pastoral parish (only two per cent of the land was arable), there was no mention of the use of artificial grasses.[60]

By 1813 much natural grass had been improved by pasturing sheep on the hills and by the ancient practice of burning old heath, although

some heathland had to be left in order to provide winter pasture.[61] Many meadows remained undrained, unenclosed and yielding low returns; but it was suggested that this should be improved.[62] Some changes had occurred, and clover and rye-grass were raised in small amounts in all areas, although chiefly by proprietors on enclosed land.[63] Sixteen pounds of red clover and two bushels of rye-grass were sown with barley crops.[64]

In the 1830s sown grasses were mentioned in several parishes. In Craignish, Kilchonan, Strachur and Tiree meadow and cultivated hay were sown, and in Dunoon and Torosay grass seed was sown down with barley.[65] In Killean too clover and rye-grass were sown with bere, and in Kilfinichen they were grown on the larger farms.[66] Clover had been only recently introduced in Kilninian.[67]

There were 36,151 acres of grass under rotation in 1854 and this rose in 1855, only to fall again from 1856 (see table 7:1).[68] Thereafter the total oscillated, but in 1874 stood at only 18,946 acres.[69] This seems to reflect the general decline in land under arable rotations, and although pastoral farming did not necessarily follow suit, the amount of pasture under rotation fell. The total of land under permanent pasture (not recorded in the 1850s) also fluctuated, but the trend was an upward one, and reflects the growing relative importance of pastoral farming (see table 7:2). It must be emphasised that rough and unimproved pasture land was not included in the census, and in a county such as Argyllshire, this must have represented a very high percentage of the total land. In 1870 there were rotation grasses and improved pasture in every parish (see maps 7:1 and 7:2).[70]

Table 7:1

GRASS AND HAY IN ROTATIONS

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	36151	141472	8942¼	18926¼	97120¼	34937¾	34823¾
1855	40303½	151216½	9473¼	22536½	113476¾	42563½	39655½
1856	30809	152220¼	9363	21242	21400¼	43125½	40972¾
1857	27517½	148504¼	9603½	20691¾	112972¾	41598¼	40311¾
1866	14321	57582	4709	9294	47835	13562	19132
1867	16552	69764	5188	8634	50854	16550	20748
1868	17645	81787	5734	10043	55037	17133	21169
1869	14186	67091	4438	9100	49451	17854	17799
1870	19735	98078	6557	12924	77195	22791	25808
1871	19615	88592	6052	12091	80609	17422	23975
1872	19733	91011	6659	13538	80442	17855	24601
1873	18549	90038	6065	11906	79906	17811	22652
1874	18946	92877	6222	12280	75116	18484	23243

Table 7:2

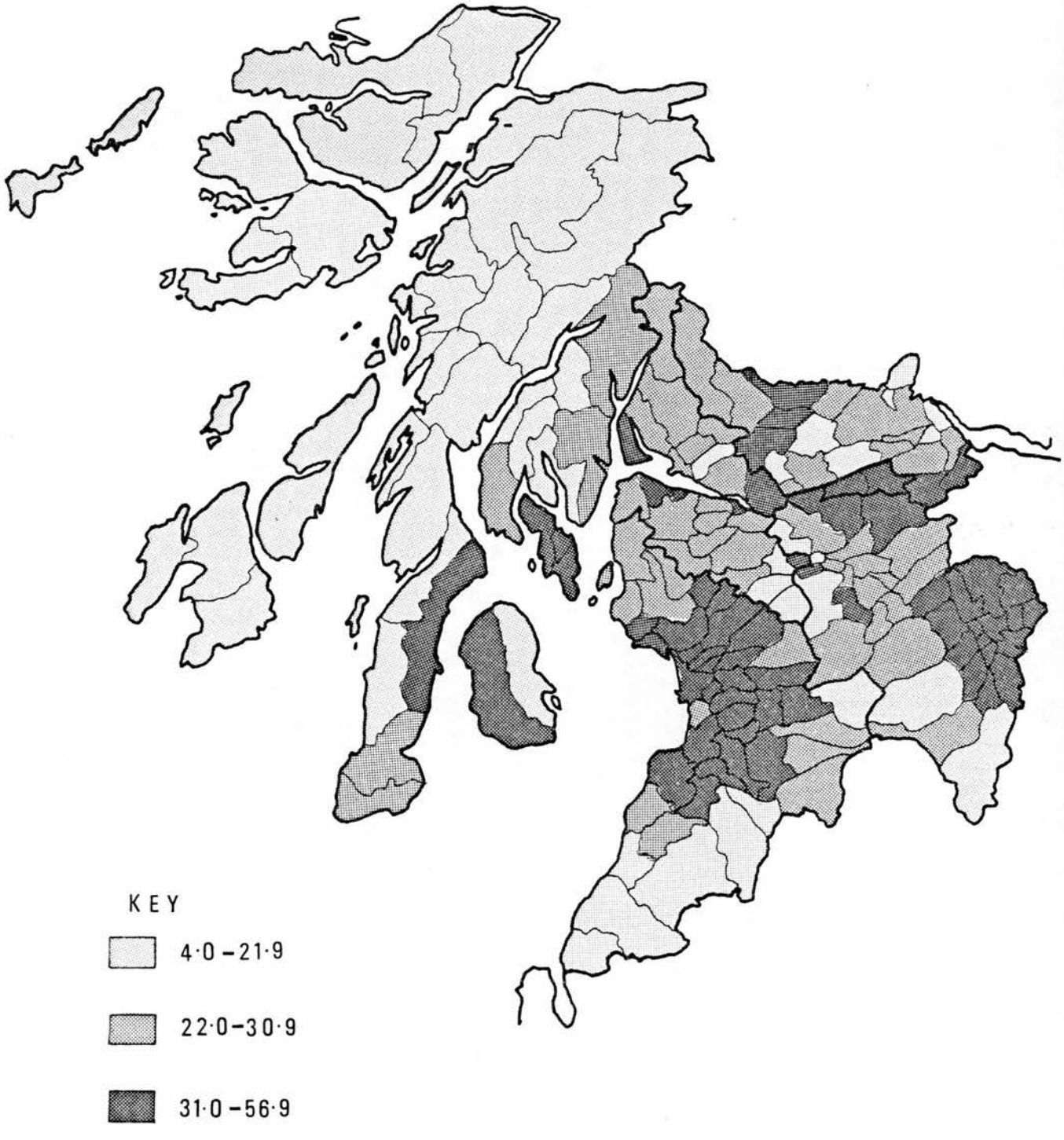
PERMANENT PASTURE - IMPROVED LAND

(Imperial Acres)

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	NO PERMANENT PASTURE CATEGORY						
1855	"	"			"		"
1856	"	"			"		"
1857	"	"			"		"
1866	52994	104088	3561	13016	69709	32493	29855
1867	55921	126918	5701	14198	77678	36795	34601
1868	60184	123930	6139	14363	83017	41287	35973
1869	65962	140534	9699	16682	99413	44642	41190
1870	55869	110299	5845	13814	82132	39869	30619
1871	53965	134485	7369	15725	84986	46173	36750
1872	54967	140772	7777	15392	82772	45735	36501
1873	56487	143004	8260	17966	87149	45978	41506
1874	56527	143240	8857	18256	94138	45558	42595

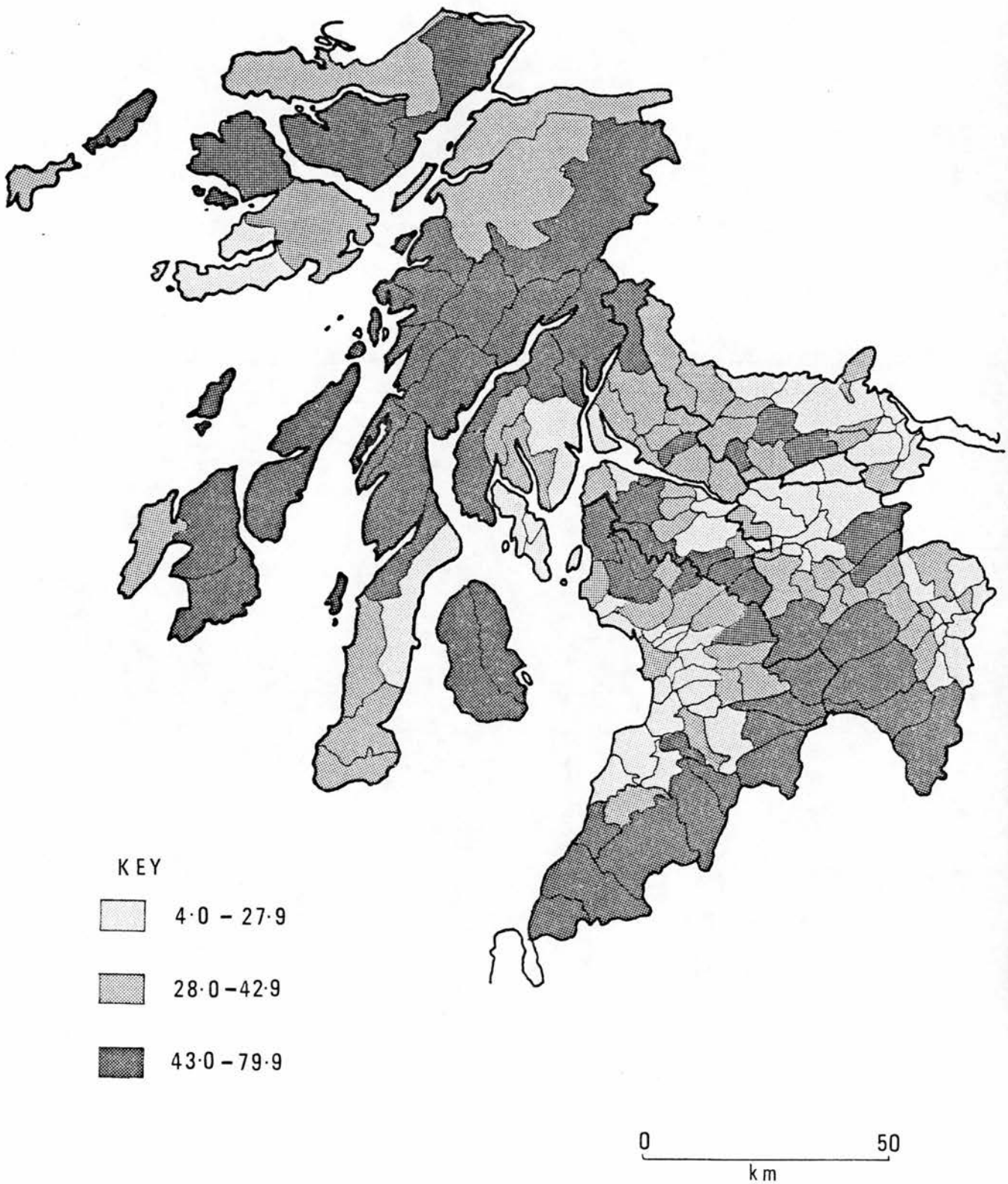
MAP 7:1

ROTATION GRASSES AS PERCENTAGE IMPROVED LAND 1870



MAP 7:2

PERMANENT PASTURE AS PERCENTAGE IMPROVED LAND 1870



AYRSHIRE

Rye-grass was a native plant of the county, but was not widely sown until after 1775. In most leases after 1780, tenants were bound to sow it but were prejudiced against it and used it only because they were forced to do so.[71] In 1793 it was felt that pastures could be much improved by the careful cultivation of meadow-grasses and the eradication of poorer species.[72] This was slowly taking place and conscious efforts were aided by the fact that the land tended naturally to grass and white clover grew wild.[73] The management of hay could also have been improved if six pounds of white and four pounds of yellow clover had been used in place of the usual 12 pounds of red clover per acre, and if hay grasses were cut before standing too long.[74] In Dalrymple there were many acres of sown grass and pasture, in Auchinleck clover and rye-grass were common and rye-grass was a usual crop in Dreghorn.[75] In Kilwinning and Kirkoswald they were included in modern rotations.[76] In Largs the hills gave excellent cattle pasture, and were said to run naturally to white clover.[77] In Old Cumnock only a few gentlemen grew grass, but most of the arable land had fallen out of lease and been allowed to run to grass.[78] In Tarbolton sown grasses were universal, and in Newton-Upon-Ayr, rye-grass and clover were the best and most profitable crops.[79] In Galston clover and particularly rye-grass were sown for hay, and white clover was produced naturally.[80] Some farmers in Loudoun grew rye-grass and red and white clover; in Kirkmichael several of them sowed artificial grasses, and in Craigie they were sown on a large scale.[81] In Dalry clover seldom was sown, but those who had tried it had obtained good results and had found a cheap way of feeding stock.[82] In Ayr, much

artificial grass was successfully raised, and in Beith rye-grass was sown on rich or well-manured land, but clover was not often raised and much hay was made from natural grass.[83] Clovers did not suit the clays of Stevenston even if manure was used.[84]

In 1812 red clover was sown on all types of soil after white crops, but did best after fallow, bere or wheat.[85] It did best on soils which had been limed, and soot was also used as a manure.[86] This could be repeated only every seven to 10 years.[87] White clover gave rich summer pasture, and could be made to spring up naturally even on sterile moss if 200 to 300 bolls of slaked lime per acre could be used.[88] Rye-grass had become very popular despite the earlier prejudice, and made good hay.[89] Only a small proportion of land was used as meadow, although this had not always been the case.[90] Meadows were valuable on moorland farms where most crops were uncertain.[91] In the lower areas, however, many meadows had been reclaimed as good arable or pasture land.[92] Much land in the upper parts of the county was, of course, under permanent pasture and was used to keep sheep.[93] In the lower areas, arable land was put under rotation grasses and was sown with clover and rye-grass.[94]

In the N.S.A. grassland was frequently mentioned, and both meadow and cultivated hay were produced in several parishes.[95] A rare case in which they did badly was Dailly where sown grasses had produced only a light crop or had failed completely.[96] In the 1850s there was a considerable acreage of rotation grass which increased until 1856 then fell, the fall in 1866 being a drastic one (see table 7:1).[97] There was a subsequent recovery and with minor oscillations the total increased during the period.[98] In the case of permanent pasture, there was an overall increase during the period, but minor

fluctuations did occur (see table 7:2). In 1870 there were substantial acreages of grass in every parish (see maps 7:1 and 7:2).[99]

BUTESHIRE

In Arran in the 1790s black cattle and sheep were the chief stock so there must have been considerable grassland to support them.[100] It is likely, however that this was in an unimproved state. In Bute at this time, Heron mentions that both rye-grass and clover were sown.[101] In the O.S.A. for Arran there is no mention of sown grasses, but Kingarth produced clover and rye-grass for sale in Rothesay.[102] Even in 1807, Headrick makes no mention of grasses being included in the rotations in Arran.[103] When exhausted the land seems merely to have been left to rest.[104] This situation still obtained in 1816; in Arran unimproved moor was used as sheep walks but there was no cultivated permanent pasture, and sown grasses were virtually unknown in the rotations.[105] By way of contrast in Bute, red clover and rye-grass were sown on the best cultivated lands near Rothesay (Kames estate) and on the lands of the Marquis of Bute.[106] The practice of alternate cropping and pasture was common in that island and in Cumbrae.[107] By the 1830s improvements in Arran were well under way, and seemingly dated from c1815 when the lands were re-divided.[108] Both rye-grass and hay were produced in Kilbride and in Kilmory, where improved rotations had been introduced.[109] Improvements in Bute seem to have continued. The Marquis of Bute's tenants in Rothesay were encouraged from c1819 to use turnips, potatoes and sown grasses within the framework of improved farming practice, so it is likely that the methods used by a few on the island in the 1790s were becoming well known to the tenants.[110]

In the 1850s there were substantial acreages of sown grasses in the county (see tables 7:1 and 7:2).[111] The total halved between 1857 and 1866 and although there was some subsequent recovery, the figures of the 1850s were not reached again.[112] In 1870 high percentages of the improved land in each parish were occupied by rotation grasses, the greatest being 43.20% in Kilmory and the lowest 19.61% in Kilbride (see map 7:1).[113] Improved permanent pastures were also found in each parish; the highest percentage of land occupied being 47.21 in Kilbride, and the lowest 6.64 in Kilmory (see map 7:2). The overall percentage of grassland in both parishes being high.

DUNBARTONSHIRE

In 1794 clover and rye-grass had been cultivated to a great extent for some years.[114] They were sown with oats, barley and even with flax.[115] Meanwhile upland heaths were being improved by pasturing with sheep.[116] Clover and rye-grass were among the chief crops in New Kilpatrick and sown grasses were mentioned in Kirkintilloch, Cardross and Bonhill.[117] In Luss artificial grasses had only recently been grown successfully, but they had gained popularity quickly.[118] In 1811 clover and rye-grass continued to be sown widely, and had begun to be used with wheat and oats as well as with barley and flax.[119] Barley had been used to prepare land for grass, but since its price had fallen wheat and potatoes were used instead.[120] The first cutting of grass was made into hay, and the second was used as food for milk cows or work horses, alternatively it could be pastured for two to three years before being broken up for oats.[121] Some fields had been sown with Yorkshire Fog and hay seeds, but this was rare.[122] Convertible husbandry was practiced, so little rich land was kept just for

pasture, but all fields were pastured for two or three years as part of the rotation.[123] Some fields were, however, kept entirely for fattening mutton and beef, and were let to graziers.[124] The mountains were used as sheep pasture.[125] Meadows were found on the banks of lakes and stagnant streams, and were frequently improved by open drains and could give much hay, although it was difficult to get it sufficiently dry for stacking.[126]

In the 1830s hay was grown widely, and in Kirkintilloch covered about 20 per cent of the arable land.[127] In Cumbernauld meadow grasses were felt to be most suitable, but Admiral Fleming had grown artificial grasses and they were included in the rotations.[128] In Kilmaronock and New Kilpatrick rye-grass was sown down with grain; in the latter case with wheat.[129] In 1854 rotation grasses covered 18926¼ acres, but by 1867 this had fallen markedly (see table 7:1).[130] The figure fluctuated thereafter and made a partial recovery. The acreage of permanent pasture increased until 1869 and fluctuated thereafter, but the trend was an upward one (see table 7:2).[131] In 1870 substantial acreages of grassland were found in several parishes (see maps 7:1 and 7:2).[132]

LANARKSHIRE

In the upper areas large flocks of sheep were kept on the best pasture.[133] Formerly this had been devoted to subsistence crops and cattle.[134] Some cattle were still raised on the coarse pastures of the east, and in the richer areas dairy cattle were kept.[135] Hay from natural meadows was the only type available until the use of artificial grasses.[136] Sown grasses were found in many parishes in the 1790s.[137] In Hamilton barley was still used to prepare land for artificial grasses, although its growth had ceased otherwise.[138] In Shotts grass

was sown with the grain crop and did well for one year, but in the second year natural grasses swamped the sown ones.[139] (Perhaps annual and not perennial seed had been used). Since their introduction to Cambuslang in the mid eighteenth century, rye-grass and clover had become very important in paying the rent.[140] In Blantyre considerable amounts of rye-grass and clover hay were grown for sale in Glasgow eight miles away, where there was always a ready market.[141] In Stonehouse, all farmers in the middle and lower parts raised rye-grass, and in Lesmahagow rye-grass and clover were sown on croft land.[142] In the upland parish of Crawford, however, few fields supported sown grasses.[143]

In the 1830s sown grasses were still popular, but apart from a few parishes in which acreages were given, there was little detail on their cultivation. In Cadder, however, the pressure for pasture was such that the lawns of mansions were let to Glasgow butchers.[144] There was a large acreage of rotation grasses in 1854, and this rose until 1856, only to fall markedly in 1866 (see table 7:1).[145] With minor fluctuations this made a recovery, but began to decline again in 1872.[146] The acreage of permanent pasture followed, with minor fluctuations, a general upward trend (see table 7:2).

RENFREWSHIRE

In 1794 artificial grasses were not in general use but were important. They were absent from the burgh lands of Renfrew, but Mr. Spiers of Elderslie was using them in his work of bringing in land, and they were included in several rotations.[147] Cunningham of Craigends used them in the new improved rotations, and sowed down ten pounds of red clover, four pounds of white clover and half a boll of

rye-grass with barley.[148] In the Abbey (Paisley) and Eastwood area, where good farming was not as well understood, only four pounds of red clover, two pounds of white clover and three firlots of rye-grass were commonly used.[149] The high demand for milk and butter near Johnstone had encouraged some people to lay the land entirely to grass, and in the Mearns area most of the land was under grass.[150] In Lochwinnoch in the 1790s second crops had recently been laid down with rye-grass and clover and in the east of Kilbarchan grasses were sown with barley.[151] In the west of the parish, however, no sown grasses were used.[152] In Kilmalcolm the natural grasses were abundant, but artificial ones were little cultivated.[153] Rye-grass had been introduced to Innerkip but was not well attended to.[154] In Inchinnan sown grasses were being raised for the Greenock and Paisley market, and in Houston this had been done for several years.[155] In Renfrew at this time much clover and rye-grass was used.[156]

In 1812 most of the upper part, and two-thirds of the middle part of the county were under artificial grasses, but there was little in the lower district.[157] Even the best farmers used only four to six pounds of clover and one and a half bushels of rye-grass per acre.[158] Problems had been encountered in separating out perennial rye-grass from the annual variety.[159] In the higher districts there was good natural pasture, but in the middle areas this was scanty.[160] Nevertheless the proximity of Glasgow and Paisley encouraged the sowing of artificial grasses.[161] The pastures were cropped for only two years then returned to grass.[162] There were some natural meadows, but they were not successful and produced poor coarse hay.[163] As in other counties hay was mentioned in the N.S.A. but little detail was given

on its cultivation.

In 1854 there were 34,937¾ acres of rotation grasses and this increased until 1856, but fell drastically in 1866, and although a slight recovery was made, the figure never again reached such a high level (see table 7:1).[164] The acreage of permanent pasture tended upwards from 1866, although there were fluctuations (see table 7:2). The picture in 1870 was of a substantial percentage of pasture in every parish (see maps 7:1 and 7:2).[165]

STIRLINGSHIRE

In 1796 sown grasses were becoming general, and red, white and yellow clover, rye-grass and plantain were widely used.[166] Usually more than half the crop was sold, and the remainder was fed to stock.[167] Sometimes a second cutting of hay was made, or the grass was pastured or cut green.[168] On the rich carses, land was ploughed up after only one hay crop, but on light land two grain crops were followed by four years grass.[169] In Baldernock, rye-grass and clover were sown with barley, then hay was made for two years before the land was pastured for a further two years.[170] In St. Ninians, rye-grass and clover were used on both carse and dryfield.[171] On the former two firlots of rye-grass and six to eight pounds of clover per acre were needed to produce 200 stones of hay, while on the less fertile latter half a boll of rye-grass, eight pounds of red and four pounds of white clover were required.[172] In Buchanan much rich ground had recently been put under grass, so the produce of grain had decreased, and in Killearn sown grasses were profitable.[173] In Kilsyth rye-grass and clover had been introduced only ten years previously, but had become very popular.[174] Grass seed was sown with the second oat crop in Strathblane,

although barley was sometimes substituted.[175] A second hay crop was taken because a good price could be obtained for it; unfortunately, however, it impoverished the ground.[176] Here too trouble had been caused by the difficulty of distinguishing annual from perennial rye-grass seed, but the Glasgow Farmers Society (to which the local men belonged) had obtained the true perennial seed from abroad.[177] Grass seed was becoming popular in Fintry as farmers followed the successful example of Spiers of Culcruich.[178] In Slamannan there were several natural meadows which produced hay for winter feeding of cattle.[179]

In 1812 clover and rye-grass were sown together with grain crops.[180] In the carses the perennial rye-grass was necessary as the native species did not spring up quickly enough, but elsewhere the annual type was thought to be suitable.[181] Many parishes produced hay for the Glasgow market, and the land then bore a second clover crop for soiling.[182] From Strathblane alone 10,000 stones of hay were sent to Glasgow.[183] There was much natural rich feeding pasture on the hills of Killearn, Strathblane, Campsie, Kilsyth, St. Ninians, Fintry, Gargunnock and Alva.[184] The upper parts were used for sheep and the lower ones to fatten and rear cattle.[185] There were also extensive meadows on alluvial river banks or in the high ground which, in favourable conditions, produced much hay.[186] In the 1830s sown grasses were still popular especially on the dryfields.[187]

In the 1850s there were substantial acreages of rotation grasses (see table 7:1). As elsewhere there was a slight decline in 1857, and a more substantial one in 1866, and after that the acreage fluctuated considerably.[188] In the case of permanent pasture the acreage increased as in other counties (see table 7:2). In 1870 a distinct difference may be seen between the carse parishes, in which permanent

grass was less important, and the others (see maps 7:1 and 7:2).[189]

CONCLUSION

Grassland played an important part in the agriculture of all counties during the period. In the 1790s rotation grasses were beginning to be used, first by the proprietors and then, either by coercion or example, by the tenants. Soon their advantages were widely understood, and the system of convertible husbandry became established. Barley seems to have been particularly popular for laying down to grass. In upland areas there was much natural pasture which could be used for sheep and/or cattle. Care was taken to eradicate the least desirable grasses, and to ensure optimum use of these areas. Natural meadows were, even in the 1790s, losing popularity although they were still found in many areas. Drying of the hay was a major problem, and when alternative means of winter feeding came into use, natural meadows fell from favour.

By the second decade of the nineteenth century, sown grasses were well established, although in Argyllshire it was still mainly the proprietors who used them. The system had been refined to suit areas with differing physical characteristics (see Rotations), but sown grasses played an important part in arable farming. In the N.S.A., although grasses were frequently mentioned, little detail was given on their cultivation, and this probably reflects the high degree to which they had been accepted since they were no longer worthy of special comment.

The pattern of rotation grasses from 1854 to 1874 is an interesting one. There were large acreages of grass in every county throughout the period, and they exceeded the grain acreages (see table

7:1 and 7:2). This reflects the importance of grass in rotations, and shows that for every acre of corn there was at least one acre of grass; that is that one or more years of grass intervened between corn crops. The grass acreage increased in every county in 1855, and likewise fell in 1857 and 1866. An overall increase was made in 1868, perhaps in compensation for the previous fall, and in 1869 there was a decrease in all counties except Renfrewshire. This was probably due to the failure of the clover crop in the dry summer of 1868.[190] An overall recovery was made in 1870, and from then on in most cases the acreage fell and rose in alternate years. This probably reflects a response to changing conditions, but underlines the basic stability of grass and of its position in rotations. It is probably for this reason that such a strong overall pattern is discernable.

In the case of permanent pasture (not recorded until 1866) an overall pattern was also apparent. It was one of general expansion, although there was a set back in 1870, and a partial one in 1872. It is difficult to explain why this should have been so, but the overall expansion may be seen as reflecting the swing from arable farming. It may well have taken the form of a lengthening of the grass course of rotations, before increasing the land under permanent grass. The agricultural censuses provide no separate information on meadows, nor do they include rough pasture land outside the cultivated area.

The overall pattern in 1870 is difficult to interpret. Most parishes had between one quarter and three quarters of their cultivated land in permanent pasture, but the rotation grasses sector was much smaller (see maps 7:1 and 7:2). This was particularly so in upland parishes. In some of the more remote areas of Argyllshire there was a small percentage of clover and rye-grass, but a high one of oats.

This perhaps reflects on older farming systems where rotation grasses played a small part in arable rotations. The same facts in the Stirlingshire carses would, however, indicate fertile land which could bear grain crops more often than many other areas.

Grassland then played a large part in farming, and even in arable areas occupied a high percentage of land. It played a part in the integrated farming system, the purpose of which was to maintain the land in good condition, and to ensure good crops of grain roots and legumes and well-fed marketable stock. Such a system cushioned the farmer against failure of an individual commodity, and was readily adaptable to changing conditions.

Chapter 8

ROTATIONS AND MANURES

ROTATIONS

Manures help to maintain soil fertility by supplying vital nutrients, rotations do so by minimising the nutrients which are taken from the soil. Although grain crops are most profitable they take most from the soil and bind it together.[1] Legumes take little from the soil and, as we now know, return nitrogen to it and loosen it, so are useful between grain crops.[2] Few soils can bear constant cropping, so pasture is a necessary element in most rotations. Indeed, the alternation of pasture and tillage formed the basis of good Scottish farming.[3] The best rotations ensured maximum profits while maintaining the land in good condition, but their elements varied according to local circumstances. The selection of suitable rotations required great skill and depended on climate, soil, location, available manure, economic factors and individual choice and preference. Clay soil was best for wheat, loam for barley and peas, light soil for turnips, sandy soil for rye, coarse soil for oats, and moist clay for beans.[4] Indeed on clayey infields beans were sometimes substituted for an oat crop.[5]

Some information on rotations has already been dealt with in the chapter on leases, but other details are available in different sources. In this section, attention will be directed towards the use of

rotations, and the elements which they contained, rather than to the role of the proprietor in dictating farming practice.

Infield-Outfield Rotations

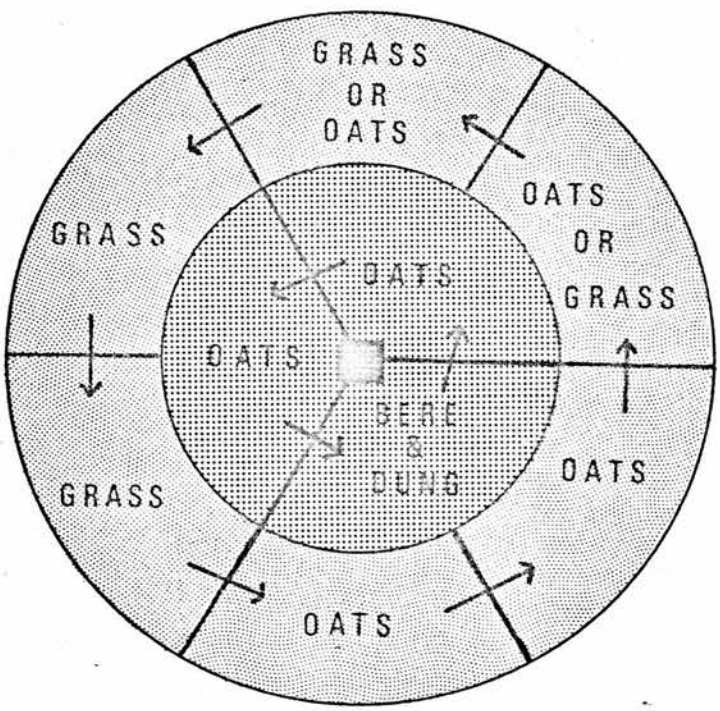
A model of growth

The information available on rotations led to the formulation of a model to explain the transition from the infield-outfield system to a more modern one, by means of increasingly complicated rotations. This will be outlined at the outset so that the evidence may be seen in its light. The traditional organisation of Scottish farming was on the infield-outfield system. Handley stated that the usual rotation on infields was 1/bere plus all the farm dung, 2/oats, 3/oats, and on the outfield, one or more crops of oats followed by several years of pasture (see diagram 8:1).[6] Within the framework of this system, it was possible to incorporate roots, fallows and legumes into the infield rotation, which in turn would have enabled more land to be brought into intensive cultivation. In the late eighteenth century several modified infield rotations were found, although there was no evidence of marked changes in the management of outfields as such.

It was felt, therefore, that the amended infield rotations could have provided a way of including part, and eventually the whole of the outfield as well as the infield in the rotation (see diagram 8:2). This seems to have been linked with a swing from barley towards wheat (see Grains). In Dalry in the 1790s bere was found to be an uncertain crop, so the dung which it had had on the infield began to be applied to the outfield, and the whole farm was gradually improved and brought in to the same system of management.[7] In Dalserf the distinction between infield and outfield had ended, and the whole farm was treated

DIAGRAM 8:1

IDEALISED DIAGRAM OF INFIELD -OUTFIELD FARM

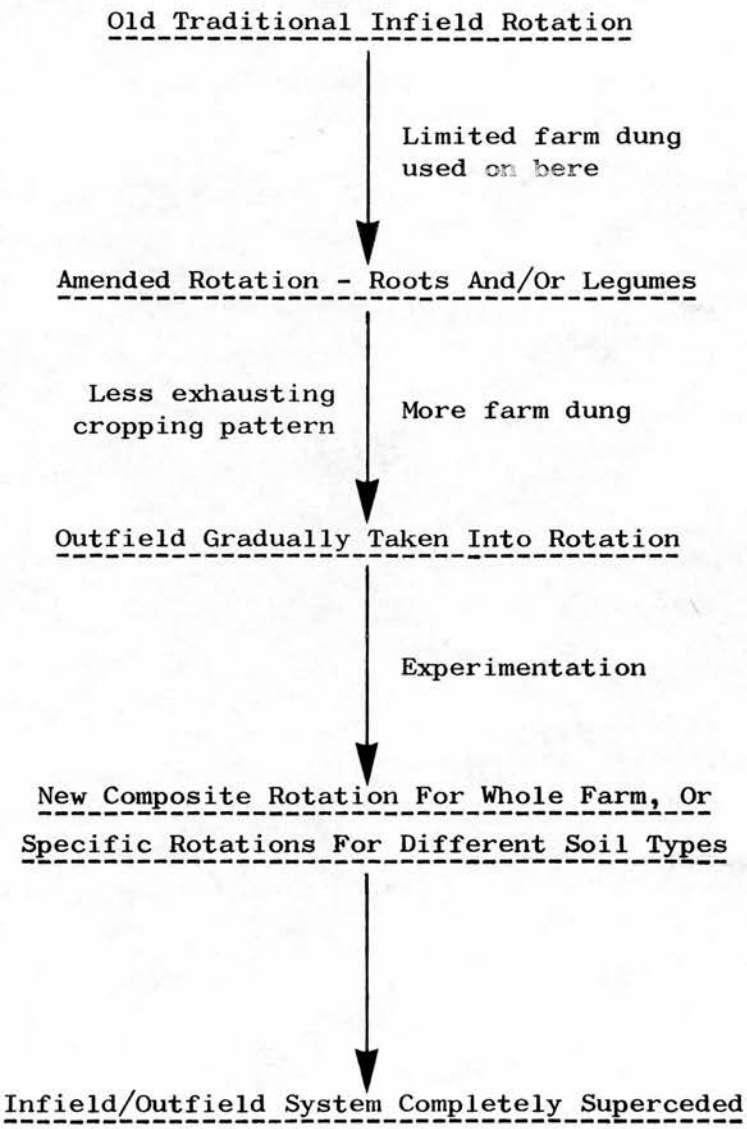


in the same way.[8] Here too the decline of barley culture was stated to have been instrumental in this change. In Bothwell the bringing in of the outfield was linked to the growth of wheat.[9] Summer fallowing of the outfield, followed by wheat, peas and oats had given very good results, and had led to the whole farm being treated in a similar way. As well as infield grain crops, these new composite rotations would have to include not only the roots and/or legumes which maintained soil fertility, but also the grain and pasture which had previously been obtained from the outfield. The numerous grain courses could have been cut down, because the outfield crops were not very productive while those under the new rotations would have been more so, but the pasture element would have remained for the support of stock and hence for the production of dung. This could have been minimised in areas where alternative manures were available (eg. town dung, guano) and the balance between crop types would have depended on numerous factors which would have led to a multiplicity of rotations. In an extreme case, by the heavy and continued use of manures, the cropping element could have been separated from the pastoral, and in more common examples, the relative length of the crop and pasture courses could have been altered in response to changing circumstances. The system was, therefore, a highly flexible one.

There seem to be two basic ways of moving from the traditional system of agriculture towards a modern one. Firstly, grain crops could be followed by lengthy periods of pasture on the whole farm (grain/grass rotations). It would probably have been necessary to incorporate roots and legumes into this system from time to time. Secondly, root and/or legume crops could be incorporated into the infield/outfield system, with the possibility of eventually including

Diagram 8:2

SIMPLIFIED MODEL OF DEVELOPMENT OF ROTATIONS



all the farm under the same system of management by a merging of the infield and outfield (composite rotations).

The Infield-Outfield System and Grain-Grass Rotations

In much of Argyllshire the infield-outfield system continued unchanged but there is evidence that various crops and fallow courses were included or substituted in the traditional infield rotations in many areas, from at least the mid seventeenth century.[10] Lord Stonefield pursuaded his tenants to use turnips, potatoes and clover by offering them premiums of £1.10 per acre in the mid eighteenth century.[11] In the late eighteenth century some areas still used the infield-outfield system and several simple rotations were used there. In Dunbartonshire in 1794, a quarter of the arable land was still worked on the following system: infield- oats/oats/barley; outfield- 2-3 oat crops then 2-3 years ley, although minor variations in the infield crops did occur viz: oats/barley/oats/ley; oats/peas/ley/oats/barley; while the outfield continued as before.[12] By 1811 enclosure had caused the system to decline, but remnants of it remained.[13] In Ayrshire the traditional system of oats/oats/bere continued until the mid eighteenth century, and in W. Kilbride in the 1790s 2 oat crops and 4 years rest was used on the outfields of those farms distant from seaweed.[14] The old system no longer continued in Kilmaurs whereby 3 crops were taken from the infield then it was rested for 1 year, while the outfield was cropped and rested for a longer period.[15] Improvements had first been introduced on the Earl of Eglinton's lands, where a crop was taken one year in three. In Kirkoswald improved rotations were introduced within the infield-outfield system; in c1750 the infield produced bere/oats/pease, and the outfield 4 oat

crops, but by c1770 hay and pature were used on the infield, and hay and peas on the outfield.[16] In Stirlingshire the infield rotation, which began to be superceded about 1760, seems to have been oats/potatoes/beans, while the outfield produced oats.[17] In Fintry the system of taking bere/oats/oats from the infield and three oat crops from the outfield was still in use in the 1790s, although a few farmers were beginning to use a better system based on the example of Mr. Spiers of Culcruich who used a rotation of turnips and potatoes/bere and grass seed/hay/hay/pasture/pasture/oats/oats.[18] In the Argyllshire parishes of Inverchoalain and Kilmartin, the infield was under bere/oats/potatoes, while in Saddel it had all the dung and seaweed so that it could produce bere/beans and peas/potatoes.[19] The outfield in Kilmartin was under two years ley then two or three oat crops. Even by 1813 more advanced rotations were rare in Argyllshire, and beans, peas and turnips, so necessary in improved farming systems, were rarely grown except in Kityre.[20] There the outfield still produced three oat crops, then was rested for four years, but a sophisticated modification of the usual infield rotation was used; potatoes/bere/oats/oats/beans/bere/oats/fallow/fallow.[21] It was however, not a good rotation, and the five grain crops must have necessitated the two years fallow for the extermination of weeds. On the Barcaldine farms of Auch (1816) and Balour (1817) better infield rotations were in use, and these bear great similarity to other Argyllshire rotations (see later).[22] In Arran in 1807 the infield-outfield system continued, although there were variations between hamlets in its operation.[23] The outfields continued under oats until the ground could no longer bear them, then pasture. The infields were under potatoes/oats and bere/mashlum/bere and dung or seaweed/peas/oats/bere and dung or seaweed.[24] If manure

was not available, the land was allowed to regenerate to pasture for two years. Yields were poor, oats giving a return of only 3-4 (although this was normal under the infield-outfield system).[25] Even by 1816 Arran was little improved and the same rotation continued, but some good rotations were found in Bute.[26] In about 1815, however, the situation began to change, and proprietors stipulated new and improved farming systems.[27] In Pettinain in the 1790s the infield produced oats/oats/bere while the outfield gave three to four oat crops and three to four years pasture.[28] Before 1750 bere/oats/peas were rotated on many farms in Lanark.[29] Even in the 1830s some outfields in Killean (Argyllshire) gave two oat crops by use of shell sand, and close to the coast, seaweed forced alternate potatoes and bere.[30] In Inverchaolain (Argyllshire) outfields still produced up to four white crops in succession, but the best croft land in Biggar (Lanarkshire) was under a relatively well-balanced rotation of oats/green crop/barley/hay.[31] In Lanark in the 1790s dung was applied to the outfields, so that a regular rotation could be carried out over the whole farm.[32] Several simple rotations based on grain crops and grass were used in areas where the infield-outfield system may or may not have continued. In East Kilpatrick in 1794 a rotation of oats/oats/oats/hay/pasture/pasture/pasture was in use in areas which were too damp for beans and peas, while damp land with a northern exposure in Carmichael in the 1830s produced two grain and four pasture crops.[33] In 1811 in areas of Dunbartonshire where improvement was just beginning, a rotation of oats/barley/hay/pasture/pasture was used.[34] A slightly modified version of the former rotations persisted on poor land in Kilmaronock in the 1830s (oats/oats/pasture/pasture/pasture/pasture), and was found in Strathblane in the 1790s and 1830s (1790s-oats or barley/

oats or barley/hay/hay/pasture/pasture; 1830s-oats/oats/hay/pasture/pasture/pasture).[35] A variation of these rotations which included flax was found in Kirkintilloch and Cumbernauld in 1794 and 1811 (1794 - oats/oats/lint } hay/pasture/pasture; 1811-oats/flax/hay/pasture/pasture).[36] By 1811 one of the grain crops had been omitted so the rotation was a less demanding one. These rotations had been only slightly modified on the wet lands of Kirkintilloch in the 1830s where a rotation of grain/grain or flax/potatoes or barley/hay/pasture/pasture was in use.[37] In Airth in the 1790s those who sowed no wheat divided their farm into three parts and put it under a rotation of barley, oats and peas and beans. Barley needed most labour and manure.[38]

In Carmunnock in the 1790s three corn crops and four to six years pasture continued because of the shortage of manure, and in 1811 MacKenzie of Clydebank used a rotation of fallow/wheat/barley/hay/pasture/pasture/pasture to reclaim gravel loams.[39] In Lanark in the 1830s a rotation of oats/oats and four to five years pasture was used on all but the best land, which was under oats/green crop (potatoes, turnips or beans)/wheat or barley/hay then occasionally pasture/pasture.[40] In Eastwood in the 1790s a rotation of oats/oats/barley/hay/hay and five years pasture was considered by Martin to be the worst in the county, although the oats/barley/hay/hay and five years pasture of Abbey and Eastwood, and the oats/oats/barley/hay of Mearns do not seem to have been markedly better although these were not criticised.[41] In Erskine until 1775 two to three oats crops followed by pasture had been common and in the west of Kilbarchan in the 1790s three to four oat crops followed by pasture were still found.[42] In the east of the parish some farmers took oats/oats/barley/hay/hay, and

in 1812 the higher parts of the county were under oats/oats/barley/hay or three oat crops followed by six years pasture.[43] Even in the gently rising districts and flat ground, some farmers took oats/oats/barley then/hay/hay or pasture/pasture/pasture (this third pasture course was omitted on the flat ground, although potatoes and wheat sometimes took second and third place).[44] Even in the 1830s in Eaglesham two oat crops and four years pasture continued while in Lochwinnoch, two grain crops were followed by grass.[45] In many Ayrshire parishes grain-grass rotations were usual. In Sorn and Monkton in the 1790s oats/oats/bere/hay/hay or pasture/then four years of pasture was taken[46] but peas / beans and peas } and bere / oats } sometimes filled the second and third course. The well-known Fairlie's rotation introduced by the Earl of Eglinton (three oat crops/hay/five pasture), and Mr. Fairlie's modification of it (three oats/hay/eight pasture) were still common c1811.[47] Even in the 1830s many parishes relied on rotations of oats, hay and pasture; Tarbolton, Sorn, Riccarton, Ochiltree, the uplands of Kilbirnie, Galston, Dunlop, Dundonald, Dreghorn, Dalrymple, and the cold clays of Ayr, Colmonell and Coylton. In Coylton experience had taught that this was the best system and Dalry used this system.[48] In the uplands of Barr two to three oat crops then four to six years pasture continued.[49] In Kilwinning the poorer lands were under two white crops and six years pasture and in Muirkirk some farmers still took up to three white crops without manure.[50]

In Ayrshire it was chiefly heavy and difficult soils which were put under this system of management, and because livestock farming was of prime importance lengthy pasture courses, necessary to balance the grains, were probably not disadvantageous.

Composite Rotations

It is possible to distinguish various types of composite rotation. Some were relatively unsophisticated, while others were far removed from the simple infield rotations.

i Carse and Dryfield Rotations

Stirlingshire shows the most simple county pattern of rotations, and it will be considered separately here. There were basically two types of rotation in use, although in detail these differed from farm to farm. Although the infield-outfield system continued in Fintry in the 1790s, in St. Ninians and Falkirk, the two types, carse and dryfield rotations, had emerged but the dryfield rotation had not yet acquired a green crop course.[51]

The carse rotation was basically fallow/wheat/beans and peas/barley/hay/oats.[52] It was a demanding rotation, but the heavy marine clays on which it was used were able to support it. Wheat was always taken, and of the six courses three were grain and one green crop. The dryfields were less fertile and their soils were more varied but even they produced two grain crops and one green crop in six years.[53] The rotation was oats/green crop/grain/hay or pasture/pasture/pasture (see table 8:3 for variations from these rotations). These two rotations became general and were mentioned in the agricultural report of 1812, and were stipulated in a series of 19 leases for Kippen and Port of Menteith (Perthshire).[54] Graham mentioned the dryfield rotation as incorporating a green crop, and several variations of the carse rotation were found; the third element was changed according to local conditions.[55] Individual leases stipulated different grain crops or gave alternatives, but the basic rotations were of a pattern. A Mr. Walker of Falkirk used a rotation only slightly amended from the carse

rotation (fallow/beans/wheat/oats/hay/oats).[56] By the 1830s most parishes used carse and/or dryfield rotations although in the dryfield of Larbert there was no definite rotation but two oat crops, a green crop, barley, and grass were ususally taken.[57] In those of Gargunnock three years pasture was used with one oat crop, a green crop, barley and hay; on limed lands two oat crops were taken.[58] In Strathblane a more sophisticated rotation was in use but the old one continued (see earlier), and a similar system was practiced in Muiravonside although it included fewer grass courses.[59] By this time the standard dryfield rotation included wheat, and in the dryfield of Polmont and the best lands of Drymen, five courses (unspecified) were used.[60] A rotation used at Gartur in 1860 seems to have been a cross between carse and dryfield types.[61]

ii Roots and Legumes in Rotations

Both roots and legumes were known to have a beneficial effect on the soil and were often included in rotations. Sometimes the term 'green crop' was used to cover potatoes, turnips or beans, but frequently specific information is available.

Improved Argyllshire rotations were based on oats/green crops/ and barley followed by hay and pasture.[62] These rotations differ from one another only in the length of hay and pasture courses. This may have resulted from varying involvement in arable farming, from differing land capability, or from increasing incorporation of outfields into the system. It is clear that proper rotations were felt to be valuable; a lease of Nether Lorne in 1800 required the use of a regular rotation, and offered the possibility of longer leases to skilful tenants.[63] By the 1830s modern rotations were recently in use in Kilmaden and Saddel, and on some farms at least in Lismore,

Table 8:3

VARIATIONS OF CARSE AND DRYFIELD ROTATIONS

Carse	
Basic carse rotation found in Airth, Bothkennar, Falkirk and Polmont for example.	1) fallow, 2) wheat, 3) beans and peas, 4) barley, 5) hay, 6) oats.
Carses of the west, north of the Lennox Hills.	1) fallow, 2) wheat, 3) green crop, 4) barley, 5) hay, 6) oats.
Carses of St. Ninians.	1) fallow, 2) wheat, 3) beans, 4) barley, 5) hay, 6) oats.
Carses of Kippen and Port of Menteith.	1) fallow or green crop, 2) wheat, barley or oats, 3) peas or beans, 4) barley, 5) hay or pasture, 6) oats.
Dryfield	
Basic dryfield rotation found in Buchanan, Drymen, Fintry, Killearn for example.	1) oats, 2) green crop, 3) barley, 4) hay, 5) pasture, 6) pasture.
Dryfield of St. Ninians.	1) oats, 2) oats, 3) barley, 4) hay, 5) pasture, 6) pasture.
Dryfield of Kippen and Port of Menteith.	1) oats, 2) green crop, 3) oats or barley, 4) hay or pasture, 5) pasture, 6) pasture.

Morvern and North Knapdale.[64] They were insisted upon in Kilmore and were used on the grain farms of Dunoon, on larger holdings in Kilbrandon and Torosay, and by the best farmers in Killean.[65] Many leases do not include specific rotations, but do restrict cropping practice; this probably indicates a belief that farmers would pursue suitable rotations of their own accord. In a lease of 1865 for Kilmore a five-course rotation was prescribed, but its elements were not stipulated.[66] Improved rotations introduced by landowners in Arran c1815 comprised oats/green crop/bere or oats or barley or wheat/rye-grass/pasture/pasture/pasture.[67] Similar rotations had been introduced into Bute by the Marquis and his factor, and the tenants were forced to keep to these.[68] Sophisticated rotations were in use on the Duke of Argyll's lands at Roseneath (Dunbartonshire) in 1794 (oats/beans or peas/wheat/green crop/barley/hay/hay/pasture for 15 years), and a new rotation with fewer pasture courses was in use at Roseneath and on dry soils elsewhere by 1811 (oats/potatoes and turnips/barley or oats/hay/pasture/pasture).[69] Yet another rotation was found on the Duke's own farm in 1811 (oats/peas/barley/potatoes and turnips/wheat/hay/pasture/pasture), and a different one in 1794 at Ardincaple and Portkiln (oats/green crop/barley/hay/hay/pasture/pasture/pasture).[70] Ure felt this to be the best rotation in the county.[71] The variety of rotations on the Duke's lands probably reflects an awareness of the varying needs of different types of soil. In the drylands of Kirkintilloch and the better lands of Kilmaronock a rotation of oats/green crop/grain/hay/pasture/pasture, was in use in the 1830s.[72] In New Kilpatrick oats/potatoes and turnips/wheat/hay/pasture/pasture, was taken (similar to Argyllshire rotations), and in Cumbernauld green crops had replaced the lint of the 1790s rotation.[73] Near Dumbarton

in the 1790s beans and peas were used to separate two barley crops.[74]

Some farms in Dalserf produced peas and beans/oats/oats/grass but most Lanarkshire rotations of the 1790s were fairly advanced.[75] Light soils of the Upper and Lower wards used a rotation including turnips and potatoes and they were also found in Symington, Lanark, Avondale and Govan.[76] Legumes were used in rotations on clays in the Lower ward, in the middle area of the county, in Dalserf, Bothwell, Cambusnethan, Lesmahagow, and West Monkland.[77] In the 1830s potatoes and/or turnips were used in Stonehouse, Carnwath, Wandell, Govan and Old Monkland.[78] Unspecified green crops were found in Lanark, Carstairs, Carmunnock, Culter, Carmichael, Libberton, Biggar, and the light lands of Dalziel.[79] The rotation of grain/fallow or green crop/grain/hay/pasture/pasture found in Libberton was also used in New Kilpatrick and a modification of it on similar dry land in St. Quivox.[80] Peas and beans were found on the clays of Dalziel, but in Bothwell regular rotations had been abandoned.[81] In none of these rotations were both legumes and roots specifically mentioned together. In Renfrewshire in the 1790s peas and beans, and roots were common,[82] although here too the two crop types were not found together. By 1811 the haugh lands of the Cart underwent a rotation similar to, but more rigorous than that used in the 1790s.[83] In 1795 flat land and that which was well manured was under a rotation including wheat, barley and oats.[84] Some gentlemen used a rotation of oats/fallow or turnips/barley/hay/pasture and the Rev. Milne of Paisley, whose hedges were too young for pasture, used the first four courses in the 1790s.[85] In the 1830s oats/potatoes/wheat/hay was used in Cathcart and Eastwood and in Erskine and Renfrew this was followed by two to four years pasture.[86] In the lower parts of Paisley there was more choice of root and grain

crops used in the rotations, while in the upper parts green crops were followed by oats and three years pasture.[87] Green crops were included in several Ayrshire rotations. For example, a rotation of oats/green crop/wheat/hay/pasture for two or more years was used in Ballantrae, Dalrymple, Dreghorn, Kilbirnie (lower area), Kilmarnock (lower area), Kilwinning, Largs, St. Quivox, Beith and Tarbolton.[88] A slightly different rotation of turnips/barley/hay/pasture was used in Dailly.[89]

CONCLUSION

In this section, it has been suggested that, in some cases at least, the transition from an open field to a modern farming system was an evolutionary one, involving the use of increasingly sophisticated rotations. It would have been possible for these changes to have taken place within a fragmented field pattern, but it is much more likely that alterations in the farming system went hand in hand with, or were preceded by, changes in the social and tenurial organisation which permitted individuals to have control over a consolidated body of land.

It is suggested that, at some unspecified point in time, new farming techniques such as the growth or roots, legumes and sown grasses and the use of non-farmyard manures, together with changes in the tenurial organisation, stimulated changes in the traditional infield/outfield system. Under this pattern, a few (often scrawny) beasts were pastured on the outfield which was recovering from several continuous oat crops, and their dung was used to force crops of bere and oats from the continuously cultivated infield. Traditionally yields were poor, and only the bere was allowed the scanty dung

available. If roots and legumes were introduced on the infield, there would have developed a less exhausting cropping pattern which, with the application of the same amount of dung would have meant higher yields of grain per acre, or the same yields over a larger area. In addition, roots would have provided better winter fodder for the livestock, which might also have benefited from sown rather than spontaneous grassland. This would have meant that more animals could be supported, so more dung would have been available and more ground could have been brought into the improved farm land of the infield. The result would have been a new composite rotation incorporating grain, grass, root and legume courses over the farm as a whole. Yields throughout the system would have been better than under the infield-outfield arrangement, and it was more flexible. The relative importance of the individual elements in the system could vary according to physical and economic circumstances without undermining its operation. The new system would require a series of enclosed fields in which grazing animals could be confined during the pasture course, and prevented from eating other crops. The progress of evolution would have varied from area to area, and may well have proceded unevenly through time.

This model is clearly a simplistic approach to a wide field of agrarian development. While it has been shown that infield/outfield rotations were modified by the inclusion of roots, legumes and sown grasses and that the whole farm began to be seen as a unit, much of what is outlined in the model is pure conjecture. In order to test its validity much detailed work on the relationship between land organisation and agricultural improvement in the early modern period would have to be done, as would detailed local studies on the evolution of rotations and enclosures over several centuries. This is beyond

the scope of this pioneer study, but it is hoped that the ideas generated here may encourage others to develop or disprove the model. It must be remembered, however, that the model does not pretend to be universally relevant. There must have been areas where not all elements were present, and there were certainly those where the change from an infield/outfield to an enclosed farming pattern was planned. It may have been, however, that such schemes were copying those where the system had evolved.

CASE STUDIES

The pattern of rotations is an extremely complex one, and to illustrate this some case studies have been chosen. These show the widely varying details in rotations used on the same estate and even the same farm. In some cases, a set rotation is not followed through. This indicates that rotations were finely adjusted to suit local circumstances which were constantly changing. The best farmers were prepared to adjust farming patterns, within the framework of good husbandry, to suit individual needs, rather than being bound to a routine. Despite their reputation for conservatism, at least the better ones among them were constantly experimenting and altering their cropping patterns to suit the needs of the proprietor, the land, the weather and the market to their own best advantage. We must also bear in mind the less skilful farmers; they too were found in the study area.

1. Ayrshire Rotations, Early Nineteenth Century[90]

Aiton gives details of various rotations used by prominent Ayrshire farmers in the early nineteenth century. These were selected

to suit the type of land in question, and reflected individual preferences as well as agricultural theory. John Tennent of Girvan Mains used two types of cropping system on the farm of Shields. On the coastal lands he took 1) oats from lea, 2) drilled turnips, 3) oats, barley or wheat with grass seeds, 4),5),6) pasture. The heavy loamy part of the farm was kept in tillage for 6 years without pasture. The rotation was 1) oats from lea, 2) fallow, 3) wheat, 4) beans, 5) barley or wheat with grass seed, 6) hay. He had even found a way of making the fallow course productive. "Of late I sow grass-seeds with the fallow crop and end the course with it to secure the better grass". One Richard Oswald of Auchincruive took a six-course rotation from the light lands. This was 1) oats from lea, 2) fallow or beans or peas, 3) wheat, 4) drilled green crop or fallow, 5) bere or oats, 6) hay - sometimes a few years pasture too - and David Millar in Shawhill used a similar one 1) oats, 2) fallow, 3) wheat, 4) beans, 5) bere, 6) hay. In the neighbourhood of Culzean, Oswald used a different rotation 1) oats from lea and lime, dung or seaweed, 2) oats, 3) potatoes or turnips with dung, 4) wheat, 5),6),7),8),9),10) pasture. A Mr. Henry in Sanquhar near Auchincruive had used a similar rotation for 20 years 1) oats, 2) turnips, potatoes or fallow with dung, 3) wheat, 4) clover - sometimes a few acres of pasture for dairy cattle. Although similar to Richard Oswald's rotation, this one sacrifices an oat crop to greatly shorten the pasture course. It must have reflected the farmer's individual need, and shows the ability for imitation without slavish copying. Mr. Bruce,a tenant of Richard Oswald, obviously felt no obligation to imitate his master. He used a slightly different rotation on his good land, which included two wheat crops during the course. It was 1) fallow, potatoes or turnip, 2) wheat, 3) grass cut early and fallowed after hay removed, 4) wheat, 5) beans, 6) barley with dung,

7) grass, 8) oats. Three factors in the county used four-course rotations plus pasture, similar to one another, and which may have been copied one from another. Mr. Nicholson, factor to Sir Andrew Cathcart, took 1) oats, 2) green crop or fallow with lime and dung, 3) wheat, 4) hay. Mr. Lamb, overseer to Sir Hugh Hamilton-Dalrymple of Bargany took 1) oats, 2) turnips or potatoes with lime and dung, 3) wheat or barley, 4) hay, then 4 years pasture. Joseph Dunlop, factor to Lord Montgomery, used 1) oats, 2) green crop with manure, 3) wheat or barley, 4) hay, then 5 years pasture.

It would seem then, that several rotations used in the county at this time were markedly similar to one another. This probably points to a spirit of imitation. The best farmers would have been keen to use the latest cropping patterns, but were wise enough to adapt these to their own circumstances. In some cases different soil types on a farm necessitated the use of completely different rotations, and much must have been learnt by trial and error, so that individual preference and experience played a part in farming practice. Tenants were not always heavily influenced by their proprietor, and landlords must have been keen to have skilful tenants. It must, however, be remembered that the examples which Aiton cited were of farmers renouned for their skill and modern ideas. There must have been many others who used a must less admirable system, and proprietors must often have used cropping restrictions as a means of preventing the worst abuses of the soil.

2. Best Managed Farms in Kintyre, Argyllshire c1810[91]

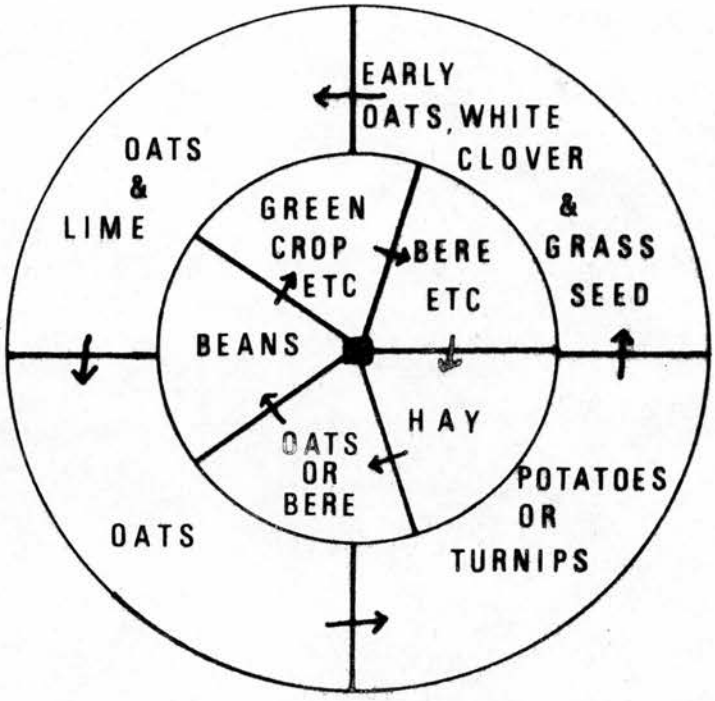
It was not only in Ayrshire that farmers were using enlightened cropping patterns. Two tenants in forward-looking Kintyre, Argyllshire

were awarded prizes for their skilful management of their farms. James Lang of Tonrioch on the Duke of Argyll's estate was using a variety of crops including wheat, turnips, legumes and sown grasses. He had entered the farm when it was in a run-down state. Unfortunately the crops grown on each field are given only for three years, so it is not possible to pick out rotations. It is clear, however, that the farm was not in infield/outfield and that a variety of crops was grown on what must have been a modern pattern. Another Kintyre tenant, Lauchlan MacEachen of Ardnacross had also made strenuous attempts to improve his farm from the ruinous state in which he had received it. He was still operating under the infield/outfield system, and more than half his farm was in outfield from which the returns were relatively poor (see diagram 8:4). His outfield rotation was 1) oats and lime, 2) oats, 3) potatoes or turnips, 4) early oats, white clover and grass seed. This was an improvement on the traditional one as it incorporated a green crop. Mr. MacEachen was, however, gradually bringing in the outfield and the boggy land so that it could cope with a proper rotation. On the old infield (and one may presume on the improved land as it was brought in) he used a rotation of 1) green crop, potatoes, turnips, 2) bere and clover and rye-grass, 3) hay, 4) oats or bere, 5) beans or on light thin soil years 4) and 5) were given to pasture and an additional course 6) oats or beans, was added.

Although these men were sufficiently news-worthly to be reported by the Highland and Agricultural Society, they were ordinary tenants, not proprietors, and were sufficiently skilful to transform an outrun farm into a modern agricultural enterprise. They did this in different ways, which perhaps suited their particular circumstances, but each sought to make the best of what he had. It is likely that Mr. MacEachen would never have got as much from the poorest outfield as from

DIAGRAM 8:4

INFIELD-OUTFIELD CROPS
MR MACEACHEN'S FARM
KINTYRE



the best land on the farm, and he may have had to use different rotations. If he did so, however, it would be to suit the land in question, rather than the necessary outcome of a lack of manure and a ruinous cropping pattern.

3. Conditions in Netherlorn, Argyllshire c1796[92]

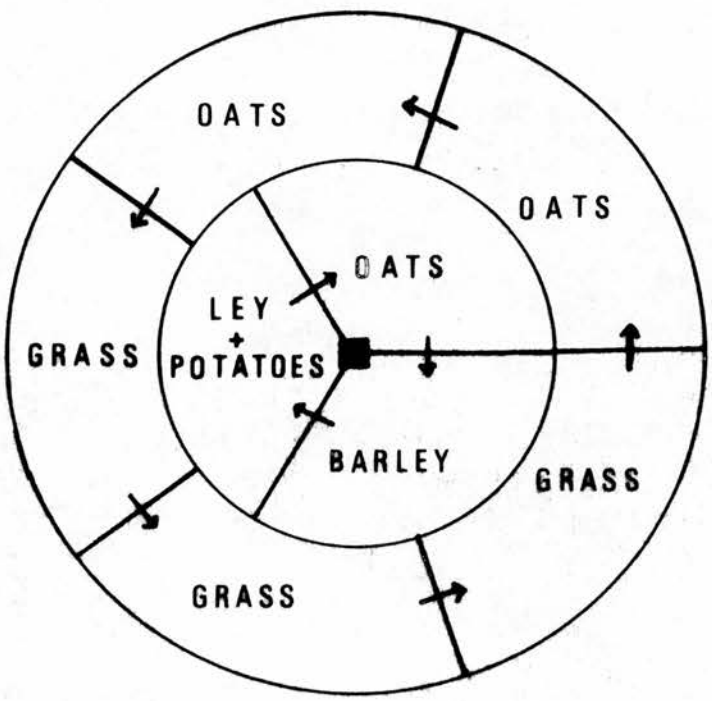
In contrast to the two skilled Kintyre farmers an example from another part of Argyllshire has been included. An agricultural survey of Netherlorn was carried out in 1796. Attempts had been made before then to improve the estate, but things were not as good as they might have been. The estate had been divided and enclosed with dykes, although in some parts at least the walls were not high enough to be of any value. The number of tenants per farm had been reduced to what it might more reasonably support. Some of the basic aspects of improvement had, therefore, been carried out, but there was a great deal of conservatism among the tenants and this prevented any real improvements being made. They quarrelled about the land that they had received (when the lands were redivided some had received the old infield, others the poorer outfields), the rents that they paid in relation to their neighbours, and there seems to have been a general feeling of resentment about the changes. The land was still held in runrig, and the infield/outfield system continued. The surveyor felt that on many of the farms the land could have supported green crops and sown grasses under a regular system of improvements. Instead infields supported 1) oats, 2) barley, 3) ley and potatoes; and outfields 1) oats, 2) oats, 3),4),5) grass (see diagram 8:5). Oufield crops were particularly poor. Things seem to have got worse after enclosure; before then tolerable crops had been obtained, but the tenants tried to use the same system after enclosure irrespective

of the quality of land which they had been allocated. This led to serious overcropping and to much confusion among the tenants. They seem to have resisted all change, and at least one man had been removed from his farm for refusing to use lime. It seems that tenants were unwilling to spend money on their land because they feared eviction. Possibly some evictions had created a general air of uncertainty which was counter-productive. In any event it is clear that the correct balance of incentives and penalty clauses had not been provided to foster improvement. Another possibility would have been to remove the worst existing tenants and to bring in new ones to set an example to the others. This may not have been possible if leases still had some time to run, or the proprietor may have felt a paternalistic responsibility to his tenants. At least a few new tenants had been brought in, but the fact that the lands were in runrig seems to have prevented them using a markedly different system from their neighbours, and if anything they seem to have copied the old slovenly habits rather than vice versa. There was one forward-looking tenant who had successfully used red clover and had tried drilling potatoes. He and his neighbour had also used lime and shell sand. The surveyor felt that since the farms were basically large enough for the tenants, and that some of the basic improvements had been made, further improvements should be possible. He recommended that tenants who made improvements should be given more land wherever possible, that the holdings should be properly divided, and that a proper plan of improvement should be drawn up. He thought that conservatism would be overcome when the benefits of improvement were realised, and a sense of security fostered.

Here, then, is an example of an estate which was not realising its potential. Basic improvements had been carried out, but these had

DIAGRAM 8:5

INFIELD - OUTFIELD CROPS
NETHERLORN



not been followed through. The changes which had been made were resisted by many of the tenants, and they had not been won over to a better system. This example shows the necessity of making a complete system of improvement, not just a half-hearted attempt at enclosure. It also demonstrates the important role which the tenantry had to play. Perhaps a group of tenants committed to the new ideas could have done much even with conditions which obtained on the estate, but instead the tenantry was wedded to the old system and had yet to be won over to the new ideas. At the close of the eighteenth century the light of improvement shone dimly in some places, but it had begun to penetrate even remote areas.

4. Dumbuck Estate, Dunbartonshire[93]

So far the idea of using different cropping systems on the same estate and on different soils of one farm has been mentioned. In this fourth case study a field by field consideration of four farms on Dumbuck Estate will be made. The estate lay on the Firth of Clyde, a mile or so east of Dumbarton, and cropping information for the farms of Dumbuck, High Mains, Laigh Mains, and East Mains is available from 1814 to 1824. High Mains and Dumbuck farms lay in consolidated units, but Laigh Mains and East Mains each had their lands in two parcels (see map 8:1), which cannot have been particularly convenient for the farmers concerned.

The cropping pattern on these farms was a very complicated one, although the bare outline of rotational patterns is discernable. High Mains shows this most clearly, (see diagram 8:6) although even here a simple pattern of a series of crops being grown on a number of fields in a cycle cannot be found. Fields 12 and 13 were under oats?/oats/ fallow/oats/oats/hay/pasture/pasture?, and this probably represents

outfield or other inferior land. The rest of the farm bore a greater variety of crops. Wheat preceded oats or barley, and in most cases, grass seed was sown down with the barley crop, and a hay crop taken before one to three years pasture. In one case hay followed directly after wheat. No clear rotation was followed through, although there is some semblance of a rotation. It is possible that a different rotation was followed on each field and this is hinted at on fields 3 and 11, where certain crops seem to be repeated as for a second run through the cycle. This may have been the case on other fields too, but the cycle may have been too long to be repeated during the period of study. It is also possible that a vague rotational plan was followed to be amended according to personal preference, state of the market and, most important, the condition of the soil (presumably a skilled farmer would have known by looking at it whether the soil was fit to bear a particular crop). It is clear therefore, that a high degree of flexibility existed.

On the farm of Dumbuck two fields again show a simple rotation of two oats crops followed by hay and pasture, and these were probably outfield or poor quality land (see diagram 8:7). On the remainder of the farm there was no clear rotation, nor even a repeat of a certain series of crops on particular fields. It is possible that this was because the rotation in use on each field contained a large number of courses, but it would seem more probable that no particular rotation was in use. It is worthy of note, however, that on each field sown grasses and pasture were used, and that no more than two white crops were taken in succession. As on High Mains barley was frequently the crop to be sown down (see Chapter 4 - Barley). It is clear then, that the rules of good husbandry, as dictated in many leases, were observed even though a particular rotation was not adopted.

MAP 8:1

DUMBUCK ESTATE

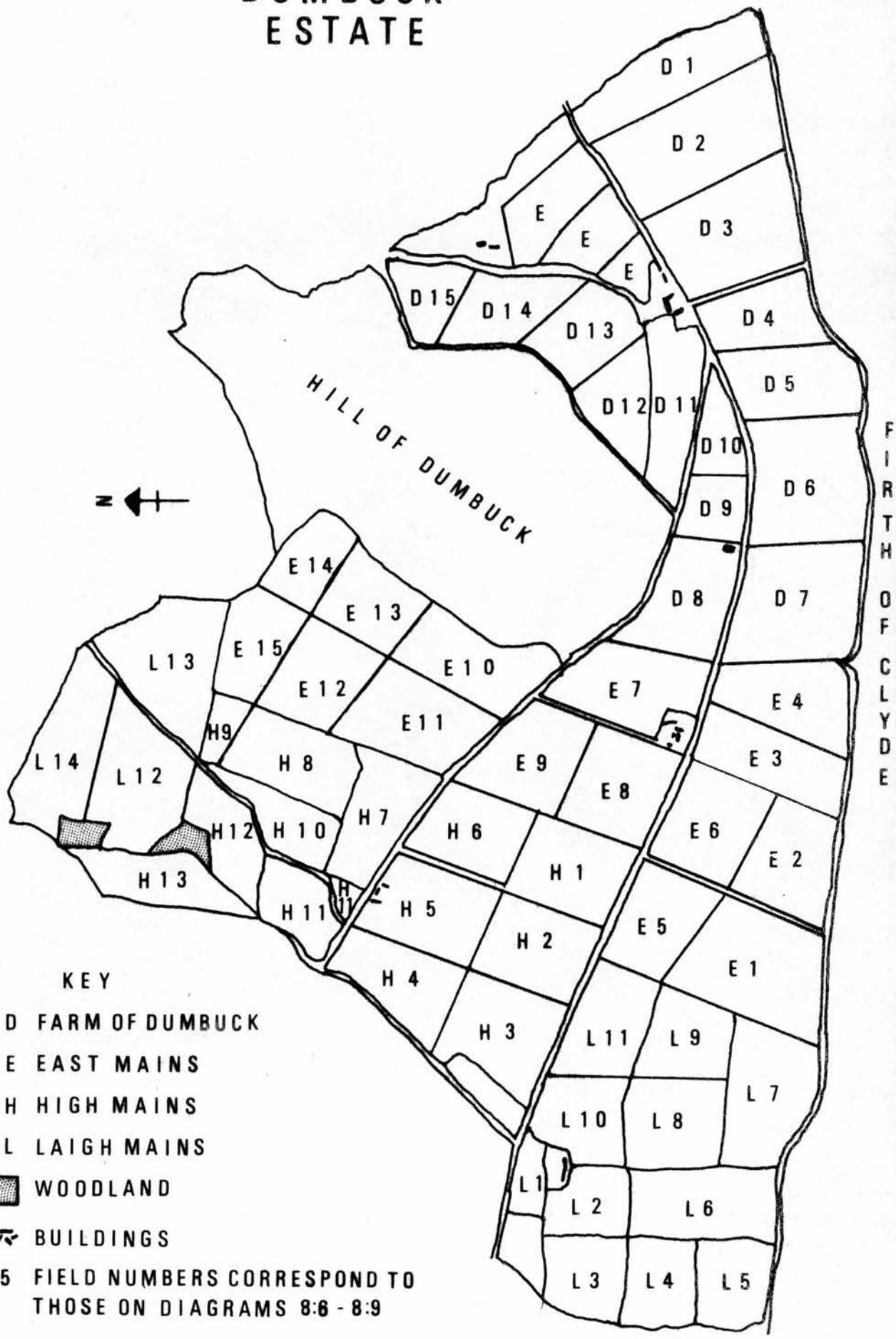


DIAGRAM 8:6

HIGH MAINS CROP ROTATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13
1816													
1817	pa	h	o + be	w	o	o	pa	ba		po	pa		o
1818	pa	pa	ba	o + be	po + t	o	pa	h		w	pa		o
1819	o	pa	h	ba	w	be	pa	pa		o	po	o	f
1820	o + be	pa	pa	h	ba	po + t	o	pa		ba	w	f	o
1821	o	o	pa	pa	h	w	po + t	pa		h	ba	o	o
1822	po + f	be	pa	pa	pa	ba	w	o		pa	h	o	h
1823	w + o	be + o	o	pa	pa	h	ba	po		o		h	pa
1824	ba + o	po + f	o + be	o	o	pa	h	w		o		pa	
1825	h	w	ba	be + o		pa	pa	h		pa	po	pa	
1826	pa	be + o	h			pa	pa	ba + o		pa	w		
1827													

DIAGRAM 8:7

FARM OF DUMBUCK CROP ROTATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1814			o											
1815			o											
1816			h											
1817	p+o f	o+ b e	p a	b a	o	h	w+ o	h	b e	o	p a	o	h	p a
1818	w	po+t+ be	o	h	o	p a	b+a h	p a	o	o	o	o	p a	o
1819	b a	w	o	p a	p o	p a	h	p a	b e	h	h	t+p o	p a	o
1820	h	g	p+o t	p a	w	p a	p a	p a	b a	p a	p a	b a+ o	o	h
1821	p a	h	b a	p a	h	o	p a	o	h	p a	p a	h	p o	p a
1822	p a	p a	h	o	p a	p+o b e	o	o	p a	p a	p o	p a	w	p a
1823	o	p a	p a	p o	p a	o	o	b e	h	o	w	h		
1824		p a		b a	p a	h	f	o	o	o	h			
1825				h	o	p a	w	f						
1826					p+o		b e							
1827														

DIAGRAM 8:8

EAST MAINS CROP ROTATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1814		pa	po+f	o	pa		o+be	w	w	r	o		r		r
1815		pa	w	po+f	pa		po+f	o	h	r	pa		r		r
1816		pa	pa	w	pa		w	o+be	pa	r	pa		r		r
1817	w	pa	pa	h	o	w	o+be	ba	o	o	po+f	h	r	f	f
1818	o	o	o	pa	po+f	h	o+ba	h	po+be	r	o+po	pa	r	r	r
1819	h	po+f	po	o	w	pa	ba	pa	w+o	f	o	o	r	f	r
1820	pa	w	w	po+t	o+be	o	h	pa	ba	o	h	o	f	w	f+o
1821	pa	o	be	w	be+o	po	pa	o	h	o	pa	h	o	o	o
1822	o	be+o	o	be	po	w	pa	o	pa		pa	pa	o	h	o
1823	o	o	h	o	w	be	pa	po+t	pa		pa	pa	h	pa	o
1824	h	o	pa	po	be	o	o	w+ba	pa	o	pa	pa	pa	pa	h
1825	pa	ba	be	w	o	h	po	h	o	h	pa	pa	pa	o	pa
1826	pa	h	po	ba	h	be	w	pa	o	pa	pa	o	pa	o	pa
1827					pa										

DIAGRAM 8:9

LAIGH MAINS CROP ROTATIONS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1814															
1815															
1816															
1817	w	pa	pa	h	h	ba	o	o + be	po + f	pa	o				
1818	pe	pa	o	pa	pa	h	o	f + ba	ba + t	o	po + t	pa	pa	o	o
1819	o	o	be + o	pa	pa	pa	ba	o	h	po	w	o	pa	po + t	ba
1820	po + t	po	be + o	o	o	pa	h	o + be	pa	w	ba	po	pa	ba	h
1821	w	w	t + f	be	po	o	pa	be + po	pa	ba	h	o	pa	h	pa
1822	o	be	w	o	w	po	pa	w + t	o	h	pa	pa	pa	pa	pa
1823		o	ba	po	h	w	pa	ba + be	o	pa	pa	po + t	pa	pa	pa
1824		po	h	w	h	be	pa	o	h	pa	pa	pa	pa	pa	pa
1825		w	pa	ba	o	o	o	h	pa		be	o	pa	pa	h
1826		ba	o	h	po	h	be + o	pa	pa	o	w	pa	pa	o	o
1827					w	pa		be	o						
1828									be						

DIAGRAMS 8:6, 8:7, 8:8, 8:9.

K E Y

ba	barley
be	beans
f	fallow
h	hay
o	oats
pa	pasture
pe	peas
po	potatoes
r	rough pasture
t	turnips
w	wheat

Although the farm of East Mains was in two portions, there is no information on the crops grown on the eastern detached portion (see diagram 8:8). Fields 10, 13, 14 and 15 show a simple rotational pattern of grain, hay and pasture after rough pasture, and it looks as if this was an example of land being improved and brought into cultivation. It is interesting that in one case wheat was the first crop to be taken from this land. A similar simple grain/grass rotation seems to have been used on fields 1 and 12. On the other fields, as was the case on Dumbuck farm, a roughly rotational pattern can be found. The series of oats/potatoes or turnips/wheat/beans occurs six times, and in two more cases it is repeated with barley as the fourth course. It is difficult to see any repeating of patterns on a single field, so again it appears that no clear-cut rotation was used on the farm as a whole and that separate rotations were not used on individual fields. Rather it would seem that we have another example of the observance of the rules of good husbandry within a flexible framework, although in this case up to 6 white crops were taken in succession. Perhaps this was from a particularly rich field and by use of large amounts of manure. As we do not have leases for this estate it is not clear whether the lease allowed for this kind of practice or, whether the farmer was infringing the proprietor's rules. It is interesting that few Dunbartonshire leases had very detailed cropping clauses (see Chapter 3). It is unlikely, that it would have been worth the farmer's while to take so many grain crops unless he was using a manure such as town dung (see Manures), especially as he was using more enlightened practices on his other fields, for example, potatoes as a preparation of wheat, sown grasses etc. The less liberal use of turnips may point to a less modern farmer, but since the evidence for this is very scanty, such a conclusion must be a very tentative one.

Information on cropping patterns is available for both portions of the farm of Laigh Mains (see diagram 8:9). Of the four fields in the smaller northern portion (fields 12, 13, 14 and 15), one was permanently under pasture, and the other three bore a relatively high proportion of grass crops and no wheat. On the rest of the farm all fields except two bore wheat. Once again, no clear rotational pattern is discernable, although there is some similarity between the cropping patterns of several fields. Only two white crops were taken in succession, and the system of farming used seems to have been a skilful one. It would also seem that none of the farms was in outfield.

This fourth case study indicates that ordered rotations were not always used, or followed through. It is likely that farmers changed their cropping patterns from year to year in response to prices, weather and personal preference within the framework of good husbandry. This may have been required of them by their lease, or may reflect a realisation of the need to keep the land in good heart so as to safeguard future returns. This example leads us to treat with caution and flexibility the idea that one rotation would be used on a farm. It is more likely that where rotations were followed through, these were not uniform on all parts of a farm, and that in some cases a much broader framework was used conforming only vaguely to a rotational pattern. It is suspected that this flexibility was much more widespread than had previously been indicated.

MANURES

Plants remove vital nutrients from the soil, and if it is to remain capable of supporting further plants, these nutrients must be replaced either by the rotting down of vegetation or by the addition of some other substance. It is for this purpose that manures are used.[1] Until the late nineteenth century little was understood of the detailed chemistry of soil fertility, but the value of various manures has been known since early times.[2] The use of manures depends on the type of soil and the plants which are grown on it, but they are generally necessary in some form. In the period of study, various manures were in use, but the extent of their use in a particular area depended on their availability and the purpose for which they were required. The various manures will be considered individually. It is unfortunate that the source material provides little information on manures after the 1830s.

1. Farmyard Dung

This was perhaps the most obvious manure, it was abundant on most farms, gave a speedy return[3] and was the best all-round fertilizer.[4] It supplied all plant food necessary, improved the texture of the soil and encouraged biochemical activity.[5] Straw formed the basis of dung, either as a food or a litter, and careful farmers ensured that all straw was carefully cut and saved for this purpose.[6] Dung was frequently collected by folding cattle and sheep; the animals were confined to the field which was to be manured.[7] Turnips were often eaten off the ground by folded sheep, and the dung laid down for the next crop,[8] but the foddering of cattle on the fields was recognised as inferior to collecting their dung in fold yards.[9] For

turnips and for light soils dung had to be well prepared because its benefits were required immediately.[10] The chief problem was over-drying, but this could be prevented by supplying sufficient liquid to the animals.[11] The dung was taken from the farm-yard to the dung-hill which was often covered with moss or earth to retain the moisture.[12] If not successfully rotted naturally, it could be turned and would invariably rot-down during the warmer weather.[13] On a grain farm the preparation of dung was a little more difficult. Straw was given to the stock and the dung was collected often to avoid trampling.[14] Fermentation was accelerated by the mixing of horse and cow dung.[15] If the beasts were soiled on clover and rye-grass, vast amounts of dung could be produced which needed less rotting than straw dung.[16] It was better to lay down small quantities of dung every few years than to make a large application infrequently.[17] Grain crops could be harmed by too heavy dunging.[18] Care was also necessary that the manure was spread evenly through the soil, or for turnips or potatoes, placed in drills with the seed.[19] Urine was a neglected element of farm dung.[20] Good farmers put down earth to absorb it, or pumped it on to the dung-hill.[21] It could be applied directly to fallow.[22]

2. Town Manure

The use of town manure was known in the seventeenth century, but its use must have spread with increased urbanisation.[23] The manure might consist of ashes, night-soil, street-sweepings, and offal, or of the dung of town-bound horses and cattle.[24] Street manure operated immediately and was responsible for rich land near towns. Urban animal dung was the richest sort, for such stock was maintained on excellent fodder.[25] Sinclair recognised a limit of 6-8 miles beyond which it was not worth carting the bulky dung.[26]

3. Lime

Lime had been popular since at least the seventeenth century and was used much earlier than that.[27] Its beneficial effects on all non-calcarious soils were well known, and it was the basis of all good farming.[28] Before laying down, the limestone was burned in kilns by quarry owners or proprietors of land, and was then slaked by the addition of water.[29] The shells could be laid down on summer fallow and slaked there, or could be left for the rain to slake.[30] The shells dissolved and were absorbed readily into the soil, but if not properly slaked the lime could take years to decompose.[31] On light lands 153 bushels of lime per acre were sufficient (more could be harmful), but on heavy clays 240-360 bushels might be necessary.[32] Fallowing or pasturing after liming was best, but if this was impossible, careful use of white and green crops was necessary.[33] Lime was vital for bringing in new ground, especially moorland, and enabled poor areas to produce tolerable crops which even the best dung could not do.[34] Lime was also required for construction purposes.

4. Marl

Like lime, marl could induce land to produce good crops for several years and it too had been in use in the seventeenth century, but only on a small scale.[35] It could be used on wheat or grass and unlike lime would not cause harm.[36] Clay marl improved the texture of light soils, but because it was troublesome to aquire, lime was usually a cheaper manure.[37] Shell marl was particularly useful and could be applied to fallow or to pasture.[38]

5. Sea Manures

Seaweed was an excellent manure, widely used in coastal areas

as early as the seventeenth century and successfull on all soils except wet clays.[39] On average it contained 9lbs nitrogen, 25lbs potash and 2lbs phosphoric acid per ton, and was therefore as valuable as dung; 20-30 tons per acre were needed.[40] Bere had been sown for years on the same land by use of seaware.[41] It was particularly useful on light soils for potatoes and barley and on grass as it made it more palatable to livestock.[42] Its benefits were however, of short duration, usually one year.[43] Sea sleech and river mud collected in firths was often used as a spring top dressing for grain and grasses.[44] Sea shells were sometimes used instead of litter for stock, whose urine aided decomposition of the shells.[45]

6. Weeds and Peat

Weeds could be made into a useful manure by putting them in alternate layers with earth and allowing them to rot down.[46] The final result was as beneficial as dung. Peat dust had been found to be a useful manure for potatoes, and ash from burned peat was sometimes used.[47]

7. Industrial Manures

Urban areas provided useful manures other than town dung. Soaper's waste was used near towns where soap was made. 15-24 tons per acre were applied and it was mixed with earth from the roadside, from ditches etc., before being laid down.[48] Horn shavings could sometimes be obtained, and were useful on land rich in vegetable matter but not on poor soils.[49] Woollen rags (shoddy) were used in Renfrewshire. They contained c3-13% nitrogen, and were beneficial for one year; 15 hundredweight per acre was used.[50] Soot was used on light gravels, limestones or chalky soils, but a mixture of one part

soot, five parts earth and one part lime was useful on any soil.[51] It was effective for one year only, but could be repeated frequently.[52] Its active constituent was c4% nitrogen in the form of sulphate of ammonia, although it also checked the activity of insect pests; it was, however, unpleasant to handle.[53]

8. Bone Dust

Bones could be crushed into lumps by a grinding mill and then applied to the land. They contain calcium, phosphate, calcium carbonate, fat, nitrogenous matter and water.[54] By the early twentieth century more sophisticated treatment of bones, into meal, flour and a dissolved state, was available, but in the mid nineteenth century, bones were applied in their crushed form, and their benefits were slowly released into the soil, although increasingly superphosphates (bones treated with sulphuric acid) were used.[55]

Bones were introduced to Scotland in 1825, and permitted much neglected land to be brought into cultivation as well as encouraging turnip culture.[56]

9. Guano

Guano consists of the droppings, feathers and remains of sea birds and was introduced to Britain from Peru c1810.[57] It contains nitrogen, phosphoric acid and potash and imports reached a peak in the 1850s.[58] Bones were little competition for guano on heavy soils.[59] Guano was extremely versatile, and could be used on heavy and light soils, but it was this versitility which excluded it from a market which was becoming increasingly specialised.[60]

Argyllshire

In Lismore in the 1790s dung was laid on the outfield before bere, and rock and shell marl were widely used.[61] Marl was used too liberally on land which had not rested sufficiently.[62] Despite the abundance of lime in the island little was used as manure because it had to be carried on horseback along poor roads, and because of heavy coal duties.[63] In 1804 the question of whether the small supplies of peat should be used for lime burning was considered.[64] At Kerrera shell-sand was successfully used on both arable and pasture.[65] Oyster shells were used on grass in some parts, but the seaweed thrown up in Loch Melfort was fed to cattle rather than being used as manure.[66] In Glenorchy lime was abundant and was used on the land.[67] In Glencoe shell-sand was felt to be the best manure for hay, and gave returns five times previous ones, but it could only benefit lands near the coast.[68] Near Campbeltown dung, lime and shell-sand were used, although there was little care given to dunghills.[69] Round Inverary too, little care was given to them, but farm dung and lime were used as manures, and in the Hebrides seaweed, dung and marl were the major manures used.[70]

In Colonsay seaweed was successful on meadow land, and in Jura it was the only manure despite the fact that lime was available in Knapdale and Islay.[71] In Saddell and Skipness all dung and seaweed was laid on the best land (wintertoun or infield) lying between the farm and the shore, and this enabled it to be under continuous cropping.[72] In Kilmartin too, the traditional system of laying lime and the winter dung on the infield, and of folding sheep on the outfield persisted.[73] In Kilbrandon the outfield was teathed and the infield manured with dung, moss and earth.[74] Although limestone was abundant it was rarely used, but shell-sand could be brought from

Colonsay, Mull and Arisaig.[75] Marl, lime and shell-sand enabled the usual crop returns of Kilarrow (see table 4:9) to be greatly exceeded.[76] In Inverchaolain seaweed was used on oats, and dung from housed cattle on bere and potatoes.[77] Sheep were easily fattened on manured land. Lime was available, but was not used because of the high duties on coal necessary to burn it.[78] Seaweed and shell-sand were found in Kilchonan and were beneficial to crops and grass especially when mixed with moss; there was no lime.[79] Seaweed, shell-sand and lime were abundant in Kilcalmonell, but here too there was a shortage of coal for lime-burning.[80] The minister had experimented successfully with peat dust and cabbage-roots as manure but these do not seem to have been in general use.[81] In Craignish the lack of lime, marl and shell-sand was a great handicap.[82] In Gigha and Cara however, storms threw up sufficient seaweed for manure, and although shell-sand was abundant it was not used.[83] In Kilfinan too limestone and shell-sand were abundant, but were rarely used, and seaweed was allowed to rot on the shore.[84] The chief manure was dung, sometimes mixed with moss, earth or seaweed.[85] Seaweed was found to be the only manure suitable for moss in Kilfinichen, but dung and shell-sand were also used as general manures.[86] The lack of cart roads made it necessary for the manure to be carried in creels on horseback and this was very inconvenient. In Kilmartin seaweed was the chief manure and produced middling crops, but limestone was also used, and marl had been discovered but not tried.[87] In Kilmore apart from dung produced by folding cattle, and seaweed mixed with moss and earth, shell-sand was imported from Wester Ross and Inverness to lay on lea.[88] Limestone was rarely used because coal was too expensive. In Lochgoilhead it was found cheaper to import lime from Ireland than to burn it locally, although little was used.[89] Seaweed too was scarce because of the rocky shore. Shortage

of manure was a major obstacle in Saddell and dung and seaweed were the only types used.[90] In Southend lime had recently been utilised; the people limed two or three acres annually and would have used it more extensively had fuel been available.[91] Banks of coral limestone offshore gave excellent manure for moist heavy land, but the problem was to obtain it.[92] In Strachur the people used as much seaweed as they could get, because its benefits lasted only one year.[93] Lime was available but the price of exploitation rendered it uneconomic (see map 8:2).

A summary of manures in use was given in 1813.[94] Many types were available including seaware, shell-sand, oyster shells, limestone and marl. Lime was felt to be under-used; indeed proprietors frequently had to oblige farmers to use it, although it was popular in Kintyre, but usually used in insufficient quantities.[95] The use of marl was not properly understood, because it had been tried on poor run-down soils rather than on old ley, where it would have done well.[96] Dung too was not properly appreciated, the animals were not given proper litter, and folding was not used sensibly.[97] Shell-sand and seaweed were good manures and their effects were reasonably well understood.[98] In Mull they were carried in creels on horseback.[99] In 1815 nearly all the tenants in Luing used lime, and there were three quarries in the area which were convenient for all the tenants.[100]

The pattern of manuring does not appear to have changed greatly by the 1830s. In the more remote parts of Ardnamurchan seaweed was carried in creels on people's backs, and together with lime it was used to reclaim moss.[101] In Inverary the 'old system' persisted and all the dung was laid on the infield, while in Inverchaolain up to four white crops in succession were forced by the use of seaweed.[102] In Kilchonan shell-sand was used to reclaim moss, and crops of potatoes,

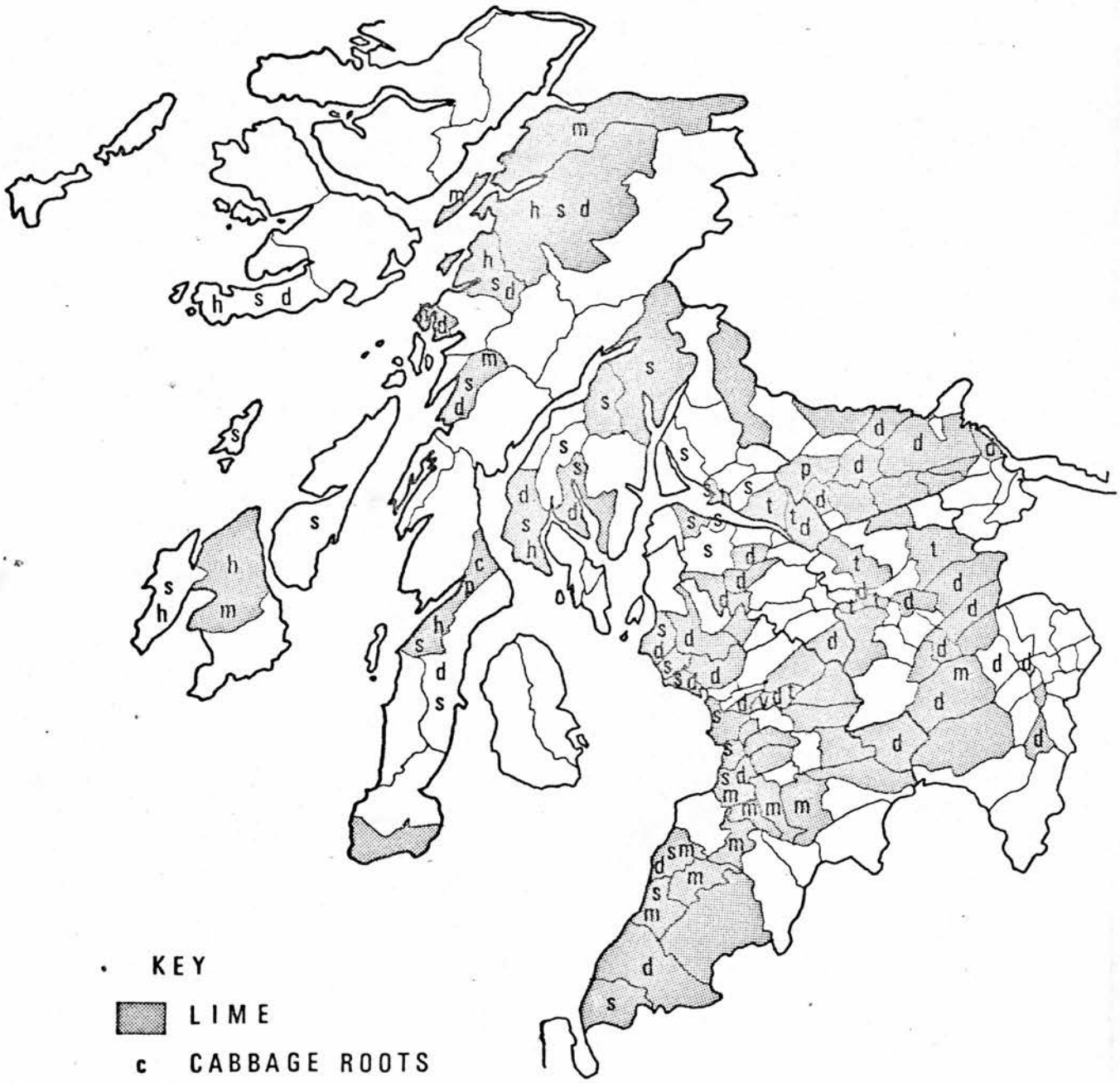
oats and grass were then obtained.[103] Shell-sand was used on the coast in Kildalton, and lime was popular inland.[104] Potatoes raised with seaweed in Kilfinichen were found to be less dry than those produced with dung.[105] Tenants in Kilarrow were encouraged to use lime.[106] In Killean the disadvantages of seaweed were appreciated.[107] Close to the sea it had been used to raise potatoes and bere, but when applied too often had a caustic effect, weakening the soil and encouraging weeds. Too many farmers ploughed more land then they could adequately manure.[108] In Torosay too, the caustic effects of seaweed were appreciated, and in South Knapdale it was used just for potatoes and bere (see map 8:3).[109] In a report on the Barcaldine estates in 1836, it was said to include some of the most fertile land in Argyll, with abundant seaweed, limestone and marl.[110] In 1853 seaware and dung were still used in Jura at least on Penny Castle and Airds farms.[111]

Ayrshire

In the later eighteenth century Fairlie of Fairlie had improved his lands; he had used 100 bolls of slaked lime per acre to assist the process and his improved methods gradually became more widely used.[112] Lime was the main manure in Ayrshire, and was supposed to add 4/- to 5/- per acre to the value of pasture and to produce much white clover.[113] It was brought to coastal areas in ballast from Larne and sold at 3/6d per ton or £5 per acre by the time it was put on the fields.[114] It was laid on fallow or, with 40-50 carts of dung or with ditch sweepings, on land prepared for wheat and barley.[115] Little care was taken to conserve dung, or to put it in alternate layers with mould.[116] Marl was appreciated too, but unless it contained much calcareous matter, it was often ineffective.[117] In Carrick, shell-marl had been used on one estate and had improved it so greatly that its rental had increased

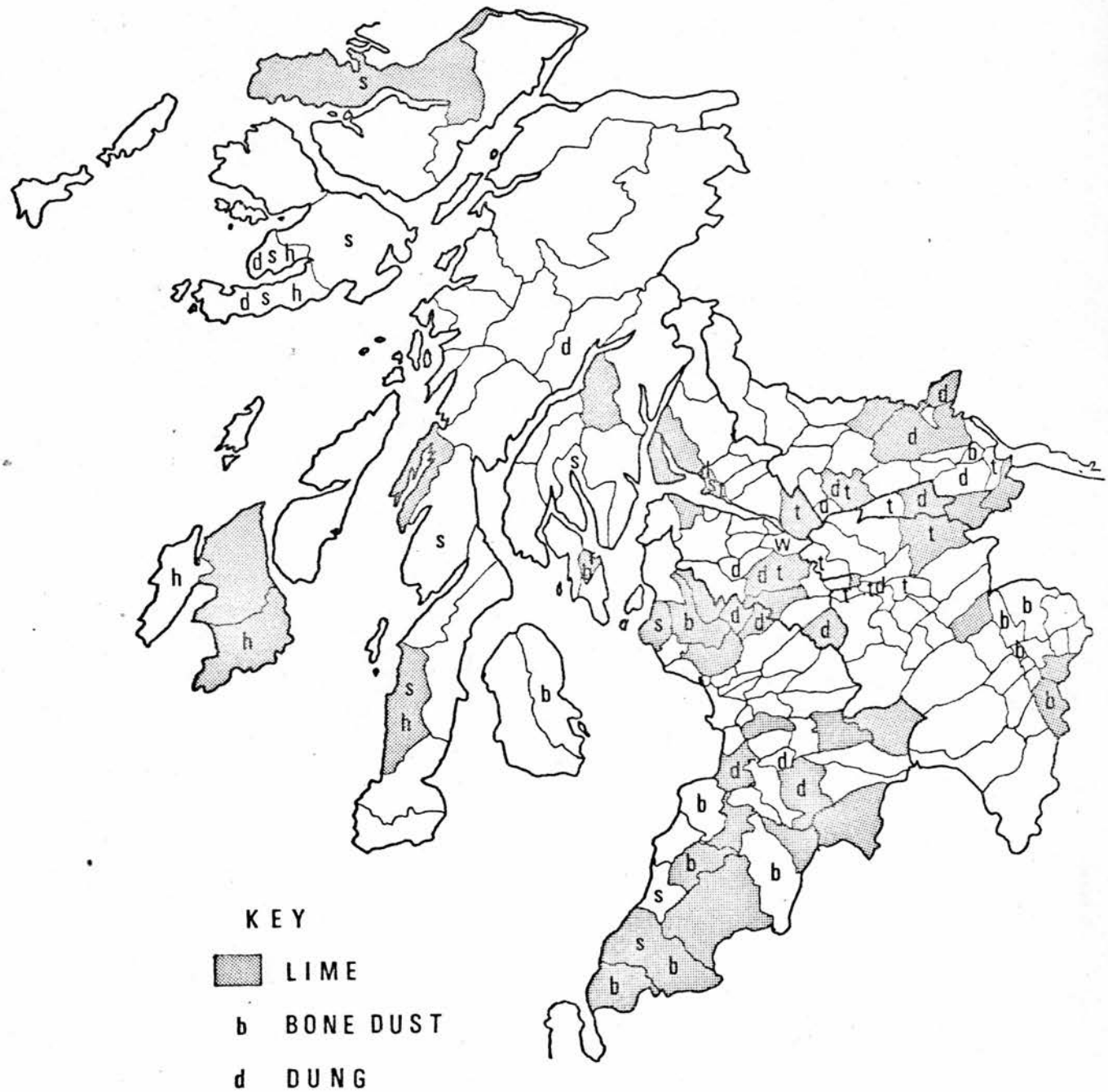
MAP 8:2

MANURES - SOURCE O.S.A.



MAP 8:3

MANURES - SOURCE N.S.A.



from £100 in the 1750s to £600-£700 per annum in 1793.[118] Soaper's waste and horn shavings were in great demand as manure.[119]

In Stevenston recent leases bound farmers to plough three years and rest the land six years, unless they dunged it, in which case they could plough indefinitely.[120] There was little seaweed thrown up. In Colmonell dung and lime could double oat yields (see table 4:9), and dung was necessary with potatoes, while in Kilmarnock 40-50 bolls of lime plus 40-50 carts of dung per acre were used with peas to bring in new land.[121] In Kirkoswald lime was introduced with other improvements, and was first brought from Dailly on horseback, but dung and seaweed were used too.[122] In Newton-upon-Ayr, seaweed was appreciated, but insufficient was thrown up to supply all needs, because the soil was infertile unless manured.[123] Lime was abundant in Beith, and numerous farmers burnt it, while in Ardrossan there was ample seaweed and lime.[124] Although there was lime in Barr, it was difficult to obtain coal with which to prepare it, so crops remained scanty.[125] In Ballantrae too, the lack of suitable roads made lime difficult to transport, although it was found close at hand; seaweed was abundant fortunately.[126] Seaweed was also used in Ayr, marl was brought from the high ground and some lime was imported from Ireland.[127] Craigie was fortunate in having two or three large limeworks and lying only two miles from coal. 60,000 bolls were produced annually and some lime was carried more than nine miles south.[128] It was also plentiful in Old Cumnock.[129] In Dalry the outfield was well limed and the farm dung was used on the croft land, although barley culture was being discontinued due to harvest rain, so dung was being used on the outfield too.[130] In Dundonald as well, Irish lime was used and was cheaper than that from Symington and Riccarton despite transport costs, because it contained more calcareous matter.[131] Farmers in

Fenwick were obliged by lease to lime their land, but thought that this caused the corn to rot and to ripen badly.[132] Although lime was abundant in Muirkirk it was rarely used, because after producing one or two good crops, it seemed to impoverish the soil, especially on sheep pasture which was the chief interest of farmers.[133] In Galston however, lime was used on the green sward and produced three good oat crops; the climate here was much more suitable for grain crops than that of Muirkirk.[134] In West Kilbride vast amounts of seaweed had been thrown up, and were the only manure used, apart from farm dung for potatoes and bere.[135] In the previous three years, however, lime had begun to be used, and old prejudices against it had been eroded by the example of neighbours. In Kilmarnock a variety of manures was used.[136] Horn-shavings gave good crops for two or three years, and lime was carried several miles for use. In Kilmaurs lime had been introduced by Lord Eglinton, and he paid for it at first.[137] Lime used in Kirkoswald was brought with difficulty five miles over the hills from Dailly; nevertheless 48,000 bushels were used in 1791.[138] In the past three years however, marl had been found, and in Kirkmichael both lime and marl were used.[139] In Loudoun lime was plentiful, and in Monkton it was carted three to four miles.[140] In Sorn the poverty of the tenants ensured that lime was used less than in some parishes more distant from supplies (see map 8:2).[141]

By 1811 various manures were in use.[142] Limestone was abundant and a good deal of it was applied, mostly in its slaked form to open clay, or in caustic form to rot vegetable matter.[143] Cattle dung was the most important manure, although sufficient care was not always taken of dunghills.[144] In particular much urine was lost. Seaweed was often used but seldom with sufficient care, and although marl was common it was frequently ignored because of the abundance of lime and

coal.[145] Composts were often made with animal and vegetable matter and this, together with 'chamber lie' and industrial waste, could provide useful manure while freeing urban areas from noxious waste.[146] Unlike Argyllshire shells were seldom found in sufficient quantities to use as manure.[147] In 1818 a lease for Kirkoswald parish granted the right to take seaweed from the shore.[148] Much seaweed was thrown up at Ballantrae, and in 1822 coal and lime were brought from Arran, Ireland and Whitehaven.[149] Much of the estate was, however, still unimproved by lime, although it could easily have been obtained. On the Hamilton estates in 1823, dung and ashes were used on potatoes; lime was added to the dunghill and seaweed was taken from the shore.[150]

For the 1830s there is comparatively little information on the traditional manures, although it is likely that they continued to be used, but probably attracted little comment. Lime and dung were used on fallow in Ayr and on lands in Beith.[151] In Barr lime was used in upland areas, in New Cumnock it had improved moors, and in Dalry and Sorn had reclaimed mossland.[152] In Dailly the Bargany estates had been improved by draining and liming.[153] Lime was abundant in Dalmellington and this meant that more land could be brought under cultivation, which in turn improved the pasture and enabled more dairy cows to be kept.[154] In Dunlop much lime was used, especially before ploughing up, and in Kilbirnie its use had spread since about 1800 largely by the example of William Cochrane of Ladyland.[155] In West Kilbride lime was used in large amounts despite the fact that it lay four to eight miles away and had to be brought along poor roads.[156] In Ochiltree the land was manured with a compost of lime and earth before breaking up.[157] In Colmonell seaweed and lime were found to increase fertility, and bone manure had recently been introduced.[158] In Dailly its use was also recent and it was popular for turnips.[159] In Ballantrae too

bone dust had been recently introduced for turnips, which were then eaten by sheep and their dung laid down.[160] Lime had been used on the hills to destroy heather and improve the pasture. It was brought two to ten miles from Colmonell.[161] In Straiton bone dust had been used for ten years, while in Maybole a Mr. McJanet had successfully used it to reclaim moor quickly.[162] Dalry was the only parish in North Ayrshire where bone manure was mentioned; it had been tried by two people but the soil was too loamy for it to be successful.[163] In St. Quivox manure for the green crop was obtained in nearby Ayr, and near Largs a four-year shift was made possible by proximity to manure.[164] In Girvan alternate crops of wheat and potatoes had been grown on the same land for more than 20 years by use of seaweed, but although seaweed was abundant in West Kilbride the right to use it belonged only to lands adjoining the shore.[165] This was probably a general practice (see map 8:3). Lime was abundant on the lands of Auchlevan, Barr and in 1872 it was hoped that the opening of the Girvan to Portpatrick railway would produce an outlet for it.[166] Some pastures to the east of iron furnaces were 'manured' by accidental deposition of soot, although this did have the disadvantage of blackening the sheeps' wool.[167] Sturrock mentioned that in the 1860s almost all farmers used guano.[168] It was carted by rail after being purchased from dealers.

Buteshire

There was no mention of manures in the first agricultural report or in the O.S.A., but from the type of farming system described it is unlikely that this aspect was highly developed. In 1807 the main manures used in Arran were dung mixed with turf, and also seaweed.[169] Limestone was abundant but was barely used. By 1811,

however, lime was said to be used regularly in Bute and Arran.[170] Shell-sand was used near Lamlash and coral in Bute.[171] Lime was well known in the county by 1816, and marl was used in Bute and was beginning to be known in Arran.[172] By the 1830s great improvements had taken place in Arran and Bute, and involved a total reorganisation of the farming system.[173] Bone manure was used on summer pasture and winter turnips in Kilbride.[174] In Rothesay too bone manure had been utilised for several years, and rape dust had recently undergone successful trials.[175] Lime from Kingarth (exported in large amounts from Kilchaton Bay) was applied liberally in Rothesay (see map 8:3).[176]

Dunbartonshire

Many of the usual manures were used here to in the 1790s. Dung was made on every farm, but often only small amounts were used, and in many cases dunghills were not properly attended to.[177] Few farmers understood the proper use of urine. Shell-lime was available in Cumbernauld and East Kilpatrick, at a cost of 12/8d per chalder, and in Kilmaronock the poor quality moor-lime had been burnt with peat but cost about 21/- per chalder.[178] Lime and peat moss were sometimes mixed together and laid upon the sward, and composts were used in some areas.[179] Sea-ware was frequently used, usually alone but it could be incorporated into compost.[180] The ease with which it could be obtained sometimes prevented proper attention to other manures. It provided a good top-dressing for grass, for oats or for potatoes.[181] Town dung was available from Glasgow, Greenock and other towns.[182] Lime was used widely in Cardross but coal to burn it had to be brought from Glasgow by water.[183] Street dung was brought at great expense from Port Glasgow and Greenock, and was also taken to Old Kilpatrick.[184] It was imported from Glasgow, Port Glasgow and Greenock to the south

part of New Kilpatrick, but it was too expensive to transport it to the north of the parish.[185] Farmers nearest the coast in Dumbarton and Rhu used seaweed, and it was used on ley in Cardross.[186] Dung, lime and compost were the chief manures in Kirkintilloch, and the lime was bought in Campsie (see map 8:2).[187]

By 1811 lime was still the general mineral manure, and its use was spreading.[188] The local kind was used, but it was also brought from Larne and Arran.[189] Originally it had come in ballast, but special loads had begun to be imported. Marl had been found but was hardly used, and trials of it at Drumhead estate, Cardross had been unsuccessful.[190] Shell-sand had been imported from the Western Isles, and successfully tried in Roseneath on light, gravelly soils.[191] Farmyard dung was still a major manure, but only in the better areas did farmers have straw yards and dung pits.[192] Seaweed was highly valued, and was usually applied alone, but could be mixed with dung.[193] Town dung was used near Glasgow and along the Clyde.[194] It came by cart to Old and New Kilpatrick (six to seven miles) and in the past four to five years its price had risen.[195] Along the Lower Clyde town dung was brought from Greenock and Port Glasgow via the Forth and Clyde canal.[196] The price of this was lower because there was no corn land round the towns of supply, but in western Dunbartonshire, town dung from this source cost as much as that from Glasgow, because it was far removed from the canal.[197] It was in great demand because it permitted the cultivation of exhausting but profitable crops.

In the 1830s lime was still a major manure. In Rhu, Irish lime was preferred because it was better quality and more easily obtained by sea;[198] similarly in Roseneath despite the fact that lime was found in the parish.[199] In Cumbernauld lime was sometimes laid on the sward, but was usually used with dung for fallow or green crop.[200]

In Cardross the use of seaweed had been largely superceded by lime and dung, or if it was still used it was as part of a compost.[201] Greenock dung was popular, and it was brought to New Kilpatrick via the Forth and Clyde Canal, but the heavy duties made it as expensive as that brought by cart from Glasgow.[202] It was brought from there at reduced cost by carts which had taken in produce.[203] 30-40 tons of dung per Scots acre were used with potatoes which could then be readily sold in Glasgow. There was no problem of transport because the roads were excellent. Town dung was taken to Kirkintilloch by canal, but in Kilmaronock there were problems of driving dung along bad roads (see map 8:3).[204]

Lanarkshire

In the 1790s lime was used widely, particularly on fallow and grassland, but in 1798 it had become very expensive.[205] The benefits of two limings were good, but further applications seldom had any effect.[206] Lime was often mixed with ditch-scourings etc., to make compost.[207] Marl was uncommon and was poor in quality.[208] There was some under the mosses of Carnwath and Lesmahagow, but these areas were too high for corn, and it was too expensive to transport the marl to the lower areas.[208] Farmyard dung was acknowledged to be a good manure, and town dung from several places was highly prized.[210] It was taken six to seven miles from Glasgow.[211] Woollen rags were successful for one year, horn shavings worked well on vegetable soils, and leather parings opened up heavy soils (see map 8:2).[212]

Lime was abundant in Lesmahagow, but was used sparingly, and in Lamington it was found to produce only two good crops.[213] In Shotts lime and compost were the chief manures.[214] In West Monkland, however, the distance from lime was felt to be a great problem, and in

East Monkland it was carried from Cumbernauld which added greatly to the expence.[215] Both parishes hoped to benefit from the Monkland Navigation.[216] Shotts was fortunate in that lime mixed with compost, suited all local soils and was readily available.[217] It was carried six miles from Hamilton and Kilbride to Bothwell, and its effects were good on the heavy clays there.[218] In Carluke lime alone was insufficient manure, and the distance from town dung was felt to be disadvantageous.[219] In Carmunnock too, lime was brought four and a half miles and was used there.[220] In Cambuslang Glasgow dung was the chief manure for the favoured wheat.[221] A Major Spens of Stonemoor in Rutherglen had imporved his farm by dunging, but had also bought oyster shells in Glasgow, had them crushed by the horses working in his gin tracks and used them successfully as manure.[222] The Clyde alluvium in Libberton produced crops without dung, and in Cadder the bed of a drained lake did likewise, but in Lamington the necessary dung was produced by folding sheep.[223]

By 1813 Lord Meadowbank had completed successful experiments in the improvement of thin hard soil by use of peat and farm dung, but the extent to which this system was used is difficult to assess.[224] By the 1830s the link between prosperous agriculture and urban areas was well-established. In Govan large quantities of potatoes were produced as a result of the plentiful supply of manure in Glasgow.[225] In New Monkland parish large amounts of dung were produced in Airdrie and this, together with lime from Cumbernauld, facilitated the improvement of the land.[226] A large amount of manure was bought in Glasgow at great expense for use in Carmunnock, although cows were kept to increase the manure supply.[227] In the west of Bothwell parish manure was brought from Hamilton and Glasgow and in the east from the growing villages.[228] The stimulus of Glasgow on agriculture was

commented on by the minister of Cambuslang, and although it is not specifically stated that Glasgow dung was used there, we may infer that it was as a toll of $4\frac{1}{2}$d was maintained.[229]

Lime had been very beneficial in Carluke and in Dalziel its lack was felt strongly.[230] It lay at least eight to ten miles away so little of it was carted. It was hoped that the completion of the Wishaw and Coltness railway would improve this situation.[231] In Culter lime had to be driven seven miles, but was used in plenty and with success provided it was not used too often on the same field.[232] Lime was used in Biggar to improve the higher ground, (deaf), and as there was in the parish a portable hand-mill for grinding bones, as well as other bone mills, it is probable that bone-dust was used.[233] In Carnwath bone dust had been introduced in 1829 for turnips.[234] By 1834 most of the larger farmers in the south of the parish used it.[235] Farm dung could be used on other ground, and the turnips were eaten off by sheep so that the land was in good condition for barley. In Carstairs bone dust had been introduced, but was not widely adopted.[236] Moss was also sucessfully used as a manure. Bone dust had been tried in Pettinain, but was rarely needed because there was plentiful farm dung due to the large amount of fodder and green crops consumed by the stock (see map 8:3).[237] In 1880 in Shotts guano and ammonia had become the chief manures.[238]

Renfrewshire

At Inchinnan and Portmauld in 1794 rich manure was available at the Portmauld distillery.[239] On the flat lands drain scourings were added to the dunghills and increased their value.[240] Cunningham of Craigends (whose rents had risen greatly) and Reverend Mylne of Paisley used lime and dung on fallow and turnips.[241] On the Earl of

Glasgow's lands, hollows for collecting dung were being built.[242] In Kilmacolm farmyard dung was used as manure but if insufficient, earth and lime were used instead.[243] Fullton of Hartfield constructed a road three miles long to the lime kiln and agreed to purchase lime for a tenant provided he followed a certain rotation.[244] The streets of Paisley were kept very clean because people collected the sweepings for manure.[245] At Pollockshaws in Eastwood parish dung was brought three miles from Glasgow where it was sold at 1/6 per cart, and was used on wheat and grass.[246] Glasgow dung was highly prized in Cathcart, but lime was used sparingly because too frequent use in the past had damaged the land.[247] Near Port Glasgow town dung could be had at 1/- per cart.[248] Seaweed was cast up at Port Glasgow, but was seldom used because of the concentration on cattle, and because most farms were in the uplands.[249] It was not much used in Kilmacolm either.[250] Seaweed was used for barley in Greenock however, but lime was in short supply and of poor quality.[251] The situation with regard to lime was similar in Houston (see map 8:2).[252]

In 1812 lime and dung were the chief manures.[253] The price of lime had risen from 10/- per chalder in 1795 to 16/- in 1812.[254] In the southeast of the county lime was brought from Kilbride, in the south west from Kilbirnie and Beith, but the chief lime works were in Cathcart, Lochwinnoch and Paisley.[255] Some lime came from the Earl of Glasgow's works at Hurlet, some from Dunbartonshire, some by canal from Campsie and Netherwood and some from Arran and the quarries along the Crinan canal.[256] It was used on pasture, summer fallow, potatoes and moss.[257] Dung was used on summer fallow, barley, potatoes and grass.[258] Recently more attention had been given to the making of compost dunghills. Dung was collected at Paisley, Glasgow, Greenock and Port Glasgow and went up the Clyde to various parts of Dunbartonshire

and Renfrewshire.[259] The price of Glasgow and Paisley street sweepings had risen from 1/4d to 2/- per cart in 1795 to 4/- to 6/-.[260] The price at Glasgow was lower than that at Paisley, which meant that it was worth carting it six to seven miles in the former, and four to five in the latter case.[261] Woollen rags could be obtained in Glasgow and Paisley, and soapers waste, soot and horn shavings were also used in small quantities.[262] There was little seaweed thrown up on the coast.[263]

By the 1830s the role of the industrial manures was very important. In Renfrew soaper's waste was the chief manure and was used on light soils to give them adhesion, although pulverised clay would probably have served equally well.[264] In Cathcart the soil was improving due to manure from Glasgow, 'the metropolis of manure'.[265] Town dung was popular in Paisley too, although lime was used on lea and potatoes.[266] Lime was carried great distances for use in Greenock.[267] In Houston there was a problem in obtaining manure, and one resident had experimented with oil and moss (see map 8:3).[268]

Stirlingshire

In 1796 lime and dung were the chief manures. Lime was used advantageously everywhere, and although peat was used for burning it, the high price of coal prevented its use from being extended.[269] Much lime was brought from Lord Elgin's works on the Forth, and despite its poorer quality, was preferred to that of Campsie and Baldernock because of the shorter carriage.[270] In the east of the county lime came from Torphicen, and in the vicinity of the canal it was brought by water.[271] Large quantities of dung were also available, because horses and cows were housed, although proper attention was not always given to dunghills.[272] Town manure was also obtained by

farmers within three miles of manufacturing villages.[273] There was little shell-marl but its loss was not felt because there was abundant lime.[274] In Gargunnock wheat was usually limed, but as dung did better, the lime was sometimes used on barley.[275] Excellent results had been obtained by mixing dung and lime. In Fintry the best results had been had by pasturing for two years, liming and then resting for one year.[276] Lime had recently been found in Buchanan, and the problem of coal shortage had been overcome by using peat.[277] Lime was abundant in Campsie and was exported to Strathblane, but it had only recently been used locally as its use had not been well understood.[278] Farmers in Denny obtained their lime from Cumbernauld and Dunipace, and those in Drymen brought it 12 miles from Kilpatrick.[279] Even to Kippen, where lime was found, richer supplies were brought 12 miles from Sauchie or Murrayshall.[280] Kilsyth exported lime to Glasgow by canal and to Kirkintilloch, Cumbernauld and Cadder (see map 8:2).[281] On the estate of Cardross, just across the Forth in Perthshire, the tenants brought lime from a distance, and used farm dung to manure the oldest lea.[282] The lime was very expensive.

By 1812 lime and dung continued as the chief manures although marl had been found in the Carses.[283] Three cargoes of slaked lime were imported to the Airth estate in 1814.[284] The practice of folding cattle had been abandoned and instead dung was laid on the fields.[285] The high value of town dung had only recently been realised, probably because farm manure was so abundant, and magistrates had had to offer premiums for its removal.[286] These had fallen from £80 in 1806 to £48 in 1809. Prior to the restrictions on distilling stock fed at the distilleries on the refuse had provided excellent dung.[287]

There is relatively little information on the use of manure in the 1830s (see map 8:3). In Falkirk the summer dung was used on the

stubble, lime was occasionally used, and Grangemouth harbour gave greater opportunities of obtaning sea-borne manures.[288] Farm dung was abundant in Campsie, and lime was found in several parts of the parish, and near to Glasgow town dung was purchased.[289] In Denny, however, a lack of capital prevented tenants buying lime and manure.[290] In Gargunnock lime enabled farmers to take two oat crops, and in Muiravonside lime was carried from Linlithgow, although in Slamannan the distance from the Bathgate and Cumbernauld lime works hindered improvement.[291] In St. Ninians lime was used extensively.[292] Only in Larbert was bone dust mentioned, and it was rarely used although it had been tried successfully in the neighbourhood.[293] Manure from Edinburgh and Leith was taken to Polmont via the Union Canal and The Firth of Forth.[294]

CONCLUSION

Lime and farm dung remained important manures throughout the period, indeed they retained a leading role right into the twentieth century. There were some fortunate parishes in which good-quality lime was abundant, in others it was necessary to carry it several miles sometimes over bad roads. Some were able to use imported Irish lime, and a few parishes were without lime or could only afford to import it in very small quantities. Dung was probably made on every farm, but there were differences in the care and skill with which it was conserved. Turnips enabled the stock to produce more dung which in turn could be used to give better grain crops.

Marl was another mineral manure, but its benefits were less well appreciated than those of lime and its effects less spectacular. In the 1790s it was used in a number of parishes in Central Ayrshire

(see map 8:2), in Lesmahagow and in a few Argyllshire parishes. This is rather surprising as Argyllshire is known to have been agriculturally backward, but marl may have been used because of the lack of urban and other manures. It is interesting that in all cases marl was used in parishes where lime was available, so the two manures were complementary. By about 1812 marl was still used in Argyllshire, but elsewhere it was ignored because of the abundance of lime, and by the 1830s marl was not mentioned in any parish, perhaps because its use had never been properly understood.

Seaweed was widely used in the 1790s in coastal areas (see map 8:2). It was never mentioned in any parish which did not have a portion of coast, and even in coastal parishes its use seems to have been restricted to a narrow strip of land. Although only one reference to this is given, it was probably because rights to seaweed were attached to lands adjacent to the shore. Even if this was not always the case seaweed was bulky and its effects lasted only one year, so it was probably not worth carrying it long distances. In about 1812 seaweed was still widely used, but in the 1830s it was mentioned in comparatively few parishes (see map 8:3). This may reflect the poorer detail given in the N.S.A., but probably points to a diminution in the importance of seaweed. Its disadvantages were realised and the fact that it required so much work to collect it, while its benefits were of short duration, must have rendered it less valuable as competition for labour increased, and alternative manures were more readily available. It was, however, still used to force crops from light lands in West Kilbride in the 1860s.[295]

Shell-sand was used for manure in Argyllshire, and by 1812 small amounts were imported to Ayrshire. In the 1790s it was mentioned in various parishes, and was still in use in the 1830s (see maps 8:2,8:3).

As with marl it was usually used in parishes in which there was lime, but it must have formed a useful subsidiary manure in areas where the practice of dunging was probably not properly understood.

Urban manure was the most highly-prized type, and its use must have benefitted not only the farmers but the town dwellers whose environment was damaged by these unwholesome substances. The use of this manure was restricted to areas within about seven miles of towns or large villages, and these areas also benefitted by being close to a market for their produce, so farms in these areas were potentially rich and highly profitable. In the 1790s town manure was used in an area roughly centred on Glasgow and Greenock, but was also available in Kilmarnock (see map 8:2). In the 1830s the pattern continued, but had extended slightly (see map 8:3). Polmont parish obtained manure from Edinburgh, and the urban manure belt stretched roughly from the Clyde to the Forth.

Bone manure was not mentioned at all until the 1830s when it was used in a few parishes in S. Ayrshire and E. Lanarkshire, and unsuccessfully in one parish in N. Ayrshire (see map 8:3). It had also been tried in one parish in Stirlingshire. Its introduction seems to date from 1827 in Straiton, and it appears to have spread from there. The fact that its use was localised probably indicates that it was introduced by one improving proprietor, who was copied by others in the same and adjacent parishes. The initiator had perhaps heard of bone dust by the recommendation of friends.

Industrial waste was used as manure periodically in areas close to such undertakings. As a general item of manure it was unimportant, but at the local scale it must have acted in addition to, or as a substitute for, urban manure.

The area as a whole then was well supplied with a variety of

manures to suit different soils. The central belt seems to have been best served, but few parishes appear to have been unimproved for want of manure. As the potential profits of farming increased, farmers seem to have become more aware of the advantages of careful and skilful use of manures. The traditional manures - farm dung, lime and seaweed - continued in importance during the period, and there seems to have been a wider understanding of a variety of other manures which could help to improve returns. The importance of transport facilities is frequently mentioned. Manure was carried by cart, on horseback, by canal, and by sea and probably later by rail, and this mobility must have greatly facilitated the improvement of land by manure, and the selection of the correct type of manure for the soil in question. The improved transport facilities, which were part of the developing economy, stimulated agriculture which in turn obtained its share of the growing prosperity. Even the waste of the urban masses could be turned to good effect in the agrarian sector.

L I V E S T O C K S E C T I O N

INTRODUCTION

The keeping of animals for gain has been an important part of farming systems since man's early history.[1] In some cases livestock have been the sole interest while in others they have formed part of an integrated farming system.[2] In Britain cattle, horses, sheep, pigs and poultry have been the chief types of livestock kept, although goats have also been important at times in certain areas.[3] It is well known that in the eighteenth century great advances were made in selective stock breeding, and new breeds were produced for particular desirable characteristics.[4] Attempts were also made to understand animal disease, to reduce mortality and to develop careful feeding.[5] These changes laid the foundation of a more scientific and less wasteful system of livestock farming which continues today and has been extended to factory farming and the battery production of poultry. By the end of the eighteenth century there was a growing awareness of the benefits of careful livestock management, and an increasing demand for livestock products from the developing urban centres where living standards and expectations were rising.[6] At the end of the period a more sophisticated, highly integrated system was in operation; indeed it was animal products to which many British farmers turned in the later nineteenth century, when foreign competition in grain production became too severe.[7]

Chapter 9

C A T T L E

In this instance the term 'cattle' will be used to cover the ox family (Bos) and not, as used to be the case, to include all classes of livestock.[8] Cattle may be kept for beef, for milk or for work and they may be classified on this basis.[9] There are various breeds which serve one or two of these purposes and the major ones which were found in the study area will now be described.

Highland Cattle

West Highland cattle or Kyloes were kept extensively in Argyllshire.[10] They were middle-sized, black or brown (although in modern times red and cream are also found), small-headed, broad-backed, strong and hardy enough to be driven overland to distant markets.[11] They fattened easily but slowly, even on poor pasture, and provided rich but scanty milk sufficient to feed only one calf.[12]

Galloway Cattle

These were kept in most parts of Scotland; they were black, long-necked, slim and hardy.[13] They were chiefly a beef breed and their hardiness made them ideal for droving, while their ability to fatten when young was useful for a speedy return.[14]

Shorthorn (Dutch) Cattle

This breed served both as a dairy and a beef animal, and in

Ayrshire, Renfrewshire and Lanarkshire, it was kept chiefly for the dairy.[15] It was red or red and white, heavy and easily adapted to various conditions.[16]

Ayrshire Cattle

This breed was developed from the Shorthorn during the eighteenth century, although its detailed history is unknown, chiefly in Dunlop and surrounding parishes in Ayrshire.[17] It was small, red or brown and white, an excellent milker but of less value for beef.[18] It could, however, be sold for meat and this was done with cows too old for milking or who aborted calves, and with bulls of 4-5 years old.[19] Aiton wrote in 1816 of an increased demand by English drovers for old Ayrshire milk cows.[20]

A. THE DAIRY

The keeping of cows for their milk is the object of dairy farming, and for its successful management high standards of cleanliness are necessary.[21] The Ayrshire was the chief type of dairy cow kept in Scotland in the period of study, and in the West dairying, particularly cheese-making, had reached a high level of development by the early nineteenth century.[22] In Ayrshire in 1793 the breed was paramount, and had become general in Lanarkshire.[23] By the 1860s they were bred locally.[24] In Cunningham the breed had been established for about a hundred years prior to 1793, and was said to have been introduced by the Earl of Marchmont and popularised by the Earl of Glasgow.[25] Few other cows were reared in Kyle and Cunningham.[26] In North Dunbartonshire Highland milk cows were kept.[27] They gave little milk and no care was taken to improve them. They were hardy and so

could survive on poor, worn out soils which were over-stocked. In the south of the county, however, the Ayrshire was quickly superceding the West Highland breed.[28] In Stirlingshire too, Ayrshires were spreading quickly.[29] In Buteshire in 1811 Ayrshire cows had been introduced, but only to supply the farmers' domestic needs for milk.[30] In 1816 some Ayrshire cows were found throughout the county, and demand for dairy produce seems to have created a greater awareness of them.[31] By the 1830s great interest in the Ayrshire breed had developed.[32] At Hawthead, Renfrewshire, Alderney cows had been introduced in 1780, although the local breed had retained its popularity.[33]

In 1866 Sturrock wrote of the great importance of dairying in Ayrshire, and of the way in which the Ayrshire breed had gained importance throughout Britain.[34] They were particularly well-suited to the relatively scanty Scottish pastures.[35]

Dairy cows in Ayrshire, Lanarkshire and Renfrewshire, were pastured during summer but sometimes this was supplemented by cut grass.[36] In winter they were fed on oat straw or bog hay until calving, when they got chaff, corn, turnips or potatoes.[37] On enclosed land they were kept out at night from May to October, but otherwise had to be herded.[38] Sufficient calves were reared to maintain the stock but the others were fattened for veal or sold off at birth.[39] Stock maintained in town dairies received very rich food and the cows were usually too old to be profitably kept on farms.[40] They were bought at, or soon after calving, and were fattened while being maintained for about four to six months for their milk.[41] When yields fell they were sold to butchers. "The old cows are sold with most advantage to Glasgow dairymen, when they are near calving, and there is a regular demand for such, as they give milk only one year, and as they are nearly ready for the butcher as soon as the milk season is over".[42]

Dairy work was done almost entirely by women; indeed, many men felt it to be beneath them.[43] It was often the wife and daughter of the farmer who did the work, as it was felt that those with a vested interest would attend more carefully to cleanliness and honest dealing than would a servant.[44] Aiton emphasised the need for cleanliness and care in the production of dairy produce.[45] Self-interest had taught people to be particular, and it must have been important to establish and maintain a good reputation.[46] A hired survant would have cared less about this. Dairymaids were sometimes allowed to have the profits of whey and buttermilk to buy trinkets.[47] Even in the 1860s, it was the women in the farmer's family who did the dairy work and only gentlemen or bachelor farmers employed a dairy maid, although occasionally a "bowing" would be let to an outsider who then obtained the profits of the stock in return for the rent.[48] This was done when the farmer and his family could not or did not wish to devote attention to the dairy.

In the early nineteenth century dairy equipment was still made chiefly of wood, and in Stirlingshire this was acknowledged to be the best material if kept clean.[49] Nevertheless, there was a swing towards lead vessels which must have been potentially harmful. Lead-lined milk coolers were replacing wooden ones in Stirlingshire, and they were also found in Dunbartonshire.[50] However, the impact of industrial change was being felt there in that cast-iron vessels lined with tin were being used. They were produced at Shotts iron works, Whitburn from 1806, and were durable, easily cleaned, and cooled the milk more quickly than did wood.[51] By 1813 the demand for them was so great that it could barely be supplied.[52] By the 1860s churns and cheese-presses were still manufactured at village level, but in the larger dairies they were worked by the threshing mill or

other machinery.[53]

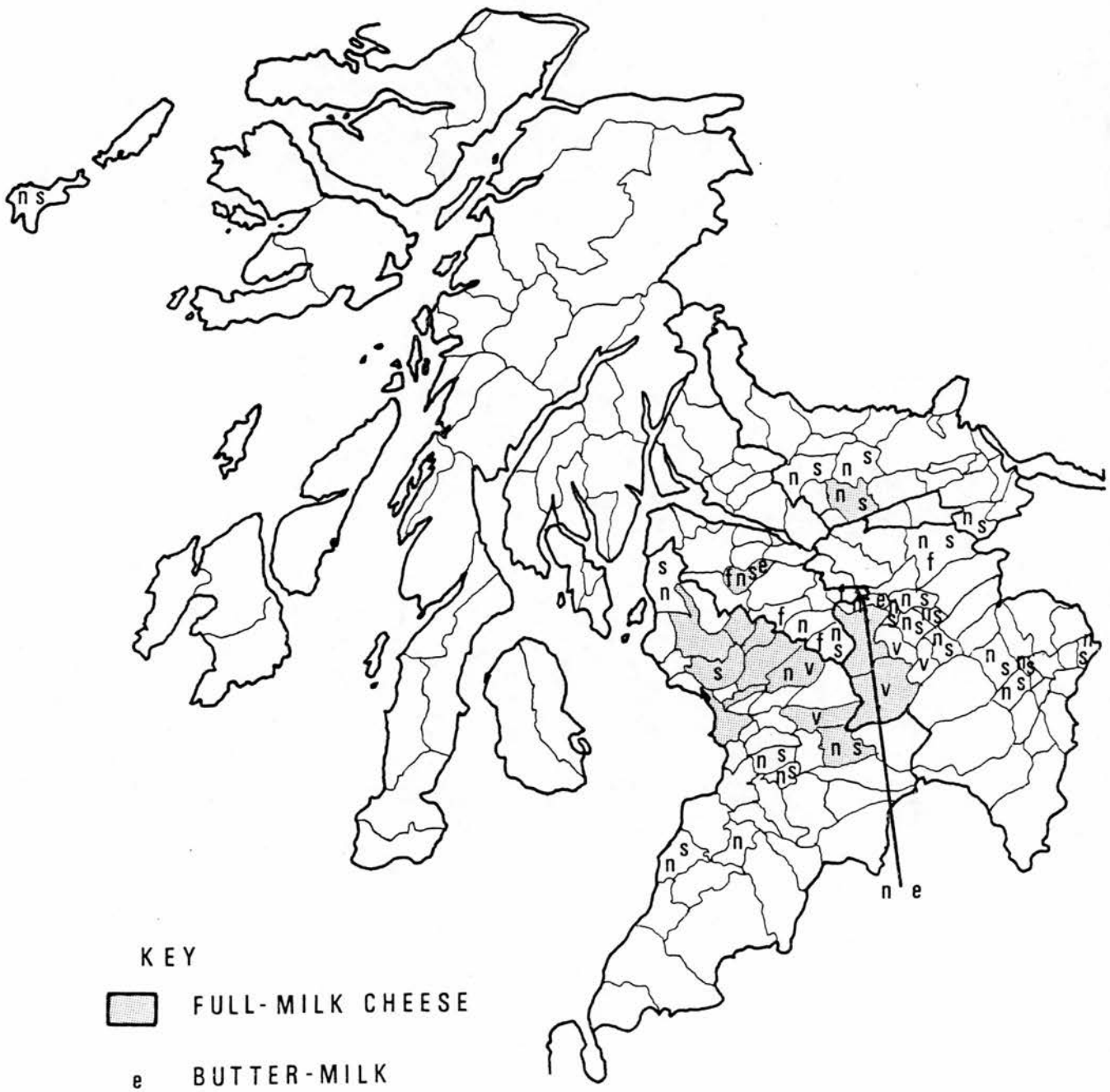
Milk could be sold fresh, made into butter or cheese, or fed to calves, and the choice of occupation which best suited individuals depended on local circumstances and especially on the accessibility of the market.

A.1 Veal

Some calves were reared to replenish the stock, others were brought to a certain age and then sold for veal, while others were sold off at birth (Slink veal).[54] Ayrshire cattle were really unsuitable for fattening beyond the veal stage.[55] The best veal animals were kept for up to eight to ten weeks in dark conditions then sold to butchers.[56] The new-born calves were fed on milk from a dish, and were encouraged to consume as much as possible; towards the end of their life they could use the milk of two cows.[57] Veal production was concentrated in Ayrshire and Lanarkshire (see maps 9:1 and 9:2). Often winter calves were fattened for veal because the price was high, the milk less abundant and the weather less suitable for cheese-making.[58] Calves born later in the season were often sold at a few days old.[59] Aiton felt veal production to be the most profitable dairy operation at the correct season of the year, although fresh milk production was more profitable overall, and Naismith saw it as the best way of using winter milk in remote areas.[60] There were suitable markets for veal in Ayr, Paisley, Glasgow and Edinburgh.[61] The most famous dairying parish was Avondale, Lanarkshire, and Lanarkshire veal fetched a high price.[62] Veal feeding was concentrated in upland areas where harvests were poor, but where oats could be profitably used for stock feeding.[63] In 1794 better winter food was becoming available and veal-rearing was spreading.[64] Veal production

MAP 9:1

DAIRY OPERATIONS - SOURCE O.S.A.



MAP 9:2

DAIRY OPERATIONS - SOURCE N.S.A.

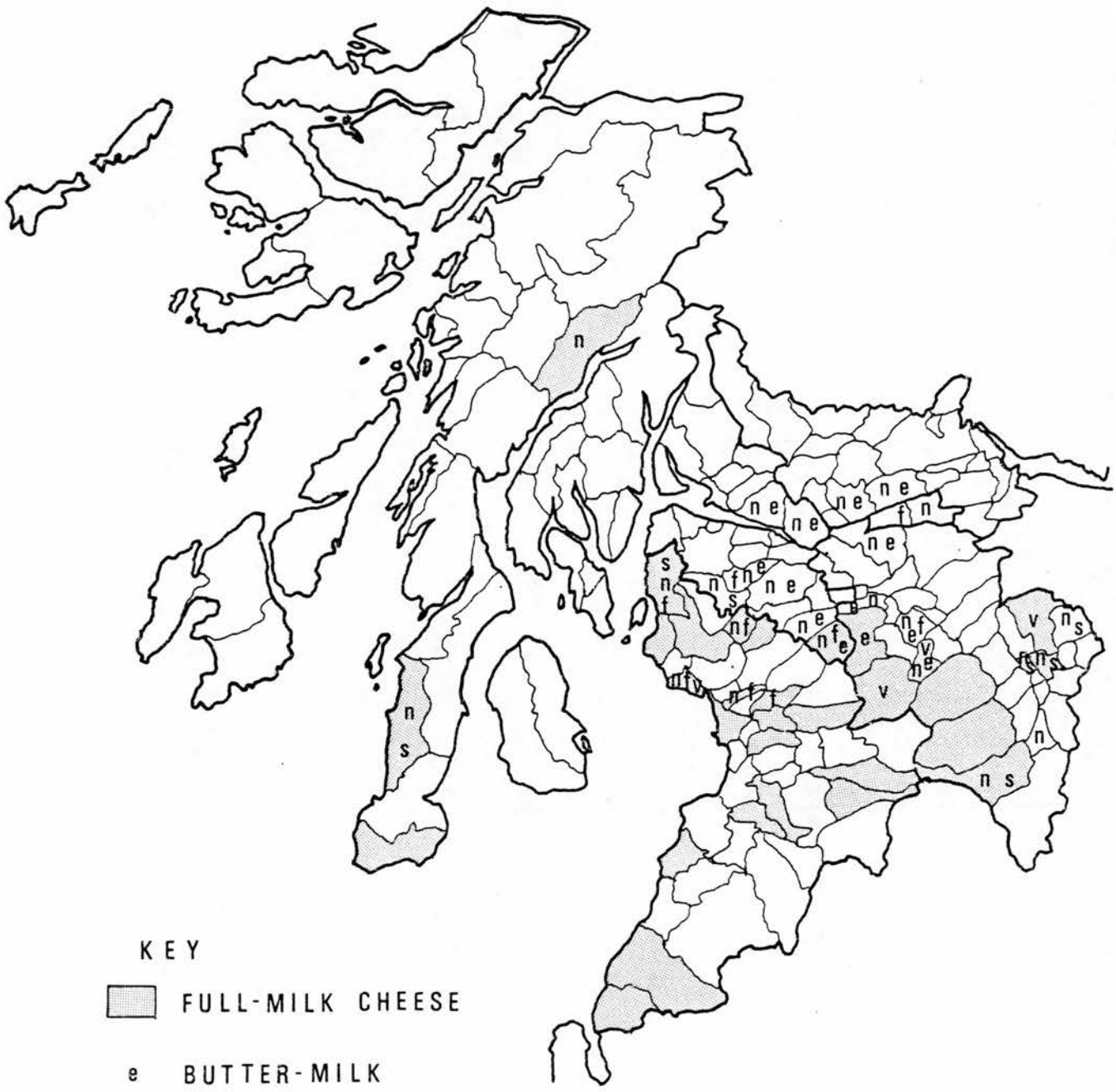


Table 9:1

CATTLE TERMINOLOGY

Some terms used to refer to cattle:-

MALES	Bull	Male Bos
	Bull-calf	Male cow receiving milk
	Stirk, yearling bull	Male cow during first winter
	2, 3 or 4 year old bull	
	Stot-calf	Castrated bull calf
	Stot-skirk	Castrated skirk
	Stot	Castrated bull of 2-3 years old
	Ox, bullock	Castrated bull of 4 years old or more
FEMALES	Cow	Female Bos, all females after first calf
	Cow-calf, quey calf	Female cow receiving milk
	Quey-stirk	Female cow during first winter
	2 or 3 year old quey	
	Young cow	Cow with first calf
	Heifer	Spayed cow (N.B. term used in some areas to mean quey)
	Free-martin	Female calf with twin brother . Such cows were belived to be sterile

From Sinclair J. (1814) op.cit.
Vol III p.23; p.47

was particularly well understood in Glassford, Dalserf and Stonehouse.[65] In Dunbarton in 1811 high veal prices tempted farmers not to rear their calves, and in Stirlingshire in 1796 the same factors operated.[66] In Ayrshire too, veal production was practised together with cheese and butter making.[67] In Galston many calves were fattened in spring for the Edinburgh market, and in Fenwick they were raised for Glasgow, Kilmarnock and Irvine.[68] In Renfrewshire around 1811 rearing for veal was less common as 80% of the calves went to the butcher at birth.[69] This pattern appears to have continued into the 1830s (see map 9:2).

In Ayrshire in the 1860s $\frac{1}{3}$-$\frac{1}{2}$ of the calves were reared to replenish the stock. The remainder were sold at birth as 'slink' veal, and veal feeding was extremely rare, although it would have produced better meat.[70]

A.2 Cheese

Cheese is a virtually non-perishable commodity which has a high value for its bulk, so that it can be carried long distances. Consequently cheese production can be concentrated further from markets than fresh milk or butter production. In modern times cheese production has become a factory process, but in the period of study it was performed at farm level. There are numerous varieties of cheese and before the twentieth century there must have been considerable variations in the quality of cheese produced as well as in type. Whey was a by-product of cheese-making. It was sometimes eaten by humans, but could be fed to horses or cows and helped increase the milk supply of the latter.[71] At a distance from towns it could be used to fatten pigs.[72] In England butter was sometimes made from whey, but this was rarely done in Scotland.[73] A few dairies near

Cumnock did this in the 1860s, but they were unusual. It was less troublesome and more profitable to feed the whey to swine.[74]

In the period of study cheese was made in all six counties (see maps 9:1 and 9:2). Whole milk or sweet-milk cheese was made in various areas but chiefly in Ayrshire.[75] Indeed, the cheese was named Dunlop after the Ayrshire parish of that name. Ayrshire was already well known as a dairying county in 1794 and sweet-milk cheese was made by curdling each day's milk separately, salting the curd, then breaking, pressing and drying it.[76] In Galston much Dunlop cheese was made for the markets of Kilmarnock, Paisley, Glasgow and Edinburgh, although it was inferior in quality to English cheese.[77] In Fenwick too sweet-milk cheese was made for Glasgow and Paisley and its value had recently risen.[78] Sweet-milk cheese was the chief product of Dunlop parish.[79] The method of making it was said to have been introduced from Ireland by one Barbara Gilmour.[80] The cheese was carefully and cleanly made, and the name 'Dunlop' gave it a ready sale in Glasgow and Paisley.[81] Similar high-quality sweet-milk cheese was made in Fenwick, Kilwinning, Galston, Stewarton, Dalry and Beith.[82] Some farmers from Dunlop had moved to Sorn and had used their cheese-making methods there for about ten years.[83] Cheese of good quality was also made in Kirkoswald, Stair and Tarbolton, but this may not have been the sweet-milk type.[84] In Kilwinning in the 1740s skimmed-milk cheese had been made, and the sweet-milk type was imported from Ireland, but by the 1790s sweet-milk cheese was exported to Glasgow and Paisley and even Edinburgh.[85] In Kirkmichael, however, cheese-making was still not understood at all.[86]

In Arran in 1807 although the milk cows were fed badly and not of the pure breed, they produced rich but scant milk.[87] This was made into skimmed-milk cheese.[88] By 1816, however, Dunlop cheese was

made in some parts of Bute, where the cattle were better than those in Arran.[89] In Kilbarchan sweet-milk or skimmed-milk cheese was made at a distance from the market.[90] In Eaglesham milk, butter and cheese were produced.[91] Good cheese was made in East Monkland, but the best was for private use, not for sale.[92] In East Kilbride the emphasis had been recently placed on sweet-milk cheese, and cheese was also made in Avondale.[93] Dunbartonshire was not famed for dairying, but in the 1790s all farmers kept cows.[94] Skimmed-milk was made into cheese and was sold among the industrial workers of the county.[95] However, Lord Stonefield at Levenside made whole-milk cheese of the English type, i.e. it was made from two day's milk, the curd was cut, squeezed, salted, moulded and turned.[96] This was known as wrought cheese in contrast to the laid cheese made in Bonhill where the curd was pressed together then salted, a much speedier method.[97] Cheese was also made by hanging up curds in a cloth.[98] By 1811 sweet-milk cheese was no longer made, probably because butter could produce biggar profits.[99] It was only in those dairies which were most distant from Glasgow that cheese was made at all. In Lanarkshire dairy cows had been kept for their dung long before the profits of dairying became worthwhile.[100] After the Peace of Paris in 1763 there was a great demand for butter and cheese, and skimmed and fresh-milk cheeses were made.[101] By 1813 dairy produce had again risen in price after a small fall in 1805.[102]

Cheese was the chief product of the Ayrshire dairies, but in 1811 some skimmed-milk cheese was made so that the cream could be removed and used for butter.[103] Dunlop cheese was still most common, but its quality was highly variable from farm to farm, and from batch to batch.[104] Thermometers were not used, and salt was not added in fixed amounts.[105] The English cheese-makers produced a more stand-

ardised product.[106]

Dairying was also important in Renfrewshire in 1812 and in the more remote parts Dunlop cheese was made, although there were few exclusively cheese daries.[107] In Stirlingshire too it was in the upland rather than the lowland parts that there were dairy farms.[108] Cheese-making was badly done; there were few proper presses, insufficient salt was used and the curd was poorly prepared. In Argyllshire the chief dairying area was Kintyre, but even here the cheese was of poor quality, especially if eaten under 12-18 months old.[109] It was made from milk which was turning sour. Very small amounts of cheese and butter were made in Tiree, and milk cows were kept in Saddel and by gentlemen in North Knapdale.[110] They were probably kept elsewhere too for domestic use. Nevertheless as early as 1815 the Malcolm Estate in Argyllshire was exporting sweet-milk cheese to London.[111]

In almost every parish in Ayrshire, and in many parts of Dunbartonshire, Lanarkshire and Renfrewshire in the 1830s dairying was important, although in Barr it had only been recently introduced.[112] Many Ayrshire parishes produced Dunlop cheese (see map 9:2), and it was also made in the Lanarkshire parishes of Lesmahagow, East Kilbride, Douglas, Carnwath (for Edinburgh), Crawfordjohn and Avondale.[113] Dairying was of much less importance in Stirlingshire and in the carses the land was rich enough to bear constant cropping (see Rotations). In many parishes there, dairy cattle were kept only to supply the farmers, e.g. Bothkennar.[114] In most of Argyllshire too, dairy cattle were kept only for family needs, although in Dunoon the dairy was increasing in importance and in Inverary good cheese and butter were made.[115] A Mr. Steuart of Glenbuckie kept 45 dairy cows and sold cheese to Edinburgh and Glasgow. In 1832 premiums were

awarded to farmers in Argyllshire for producing imitation Double Gloucester, Stilton and Cheshire cheeses.[116]

Both cheese and butter were made in several parishes in the 1790s, and this may have meant that, butter and skimmed-milk cheese were made, or that butter was made on some farms and cheese on others (see map 9:1). Such parishes were, Pettinain, Bothwell, Hamilton, Dolphinton, Dalserf, Dalziel, Fintry, Slamannan and Carmichael where dairying had greatly increased in importance in the previous fifty years.[117] In Killearn and Slamannan cream was made into butter and skimmed milk into cheese, while in Blantyre butter and cheese previously sold in Glasgow had begun to be marketed locally.[118]

The production of cheese and butter together was still common in the 1830s (see map 9:2). In Beith cheese, butter and fresh milk were produced for sale locally and in Glasgow (through cheese-merchants) and in Dreghorn they were sold in Irvine.[119] In Largs cheese was produced at a distance from the town, but close to it butter of fresh milk were more important, and in Stevenston cheese-making has been superceded by the production of more profitable butter and milk.[120] In Dalserf and Lochwinnoch butter and cheese were made, while in Dunsyre butter was made from cream, and cheese from skimmed milk although some Dunlop cheese was also made.[121] In Pettinain, Crawfordjohn and Walston this had been the system but it was being superceded by the making of whole-milk cheese which was more readily sold and valuable.[122] This was of the Dunlop, Dunlop and Stilton, and Dunlop and ewe's milk type respectively. In Crawfordjohn one or two dairies, made 'double sided' cheese; one half from cows' milk and the other from ewes' milk which sold at 50% more than the Dunlop type.[123]

In Eaglesham farmers produced the full spectrum of milk, butter, butter-milk and cheese.[124] In Cambuslang the relative profit of the

various operations was carefully outlined and clearly butter was the most profitable commodity there.[125]

In the 1860s in Ayrshire Dunlop cheese was still made in most dairies, but the Cheddar or Somersetshire type was increasingly produced.[126] Its popularity had begun in 1854 when the 'Ayrshire Agricultural Association' sponsored James Drennan and David Cunningham to visit the English dairying areas with a view to adopting some of the English methods. The Cheddar method was felt to be suitable, and from 1855 there were visits between Ayrshire and Somerset for the purpose of learning the method. Scottish Cheddar gained ground quickly particularly in Galloway. The chief incentive was that good quality cheddar could sell at high prices in London, although to engage in this trade carried a greater risk of not receiving payment than did the production of Dunlop cheese for sale in Glasgow.[127] It was only the best Cheddar which could be sold at high price in London, and the poorer quality cheese had to be sold in Glasgow where it brought only as much or less than Dunlop, where mature Dunlop always cost more than even the best Cheddar. It was only the more prosperous tenants who could enter into the venture for there was some cash outlay in becoming established, and some financial risk in getting involved in the London market.

The introduction of Scottish Cheddar was the result of Ayrshire's involvement in the national market. London had a taste for Cheddar cheese but none for Dunlop, and in order to cash in on the high prices to be had, Scottish cheese-makers had to adopt the most suitable of the English methods. As Sturrock rightly if chauvinistically points out, "if Glasgow was London and London Glasgow, very probably Ayrshire cheese would fetch the highest price in the Kingdom".[128] The importance of the London market can have developed only because of the

growth of a suitable railway system which provided transport cheap enough to leave a worthwhile profit for the producer. Cheddar cheese involved more work than the local type, and forced producers to learn new methods, and in some cases to install expensive equipment. This can only have been worthwhile if profits were sufficiently high. The Cheddar method required the use of themometers rather than the testing of temperature with the finger. Also the cheeses were larger, and the job of lifting them was difficult for women. A Mr. Lindsay of Townend had fitted a steam boiler to regulate the temperature of his storage rooms, and this could be used to heat the milk and to save the dairy-maid much lifting.[129]

In Lanarkshire dairies too, the 'Somersetshire' method was gaining importance, although Dunlop cheese and skimmed milk cheese as well as butter continued to be made.[130]

A.3 Butter

Butter production can be seen as an alternative to cheese-making although both could be made on the same farm. Butter gave a quicker return than cheese and left separated milk or butter which could be sold as a by-product.[131] It was a cheap and nourishing food popular with the poorer classes.[132] The relative profitability of butter and cheese varied according to price, but fresh butter was more perishable than cheese, and could not be carried as far. Butter dairies were found near towns and produced butter and buttermilk, but at other dairies at a greater distance from the market, butter and skimmed-milk cheese were made.[133] Butter dairies were found within about ten miles of large towns wherever fresh milk could not be sold because of lack of demand or distance from the market.[134] The whole milk was churned, although this produced less rich but better tasting butter

than if the cream only was used.[135]

As with cheese, Ayrshire led the field in butter production and in 1793, when cheese sold at 2½d - 4d per lb.,butter brought 6d - 7d.[136] It was in the area 1½ - 10 miles from Glasgow that butter and buttermilk were produced (see map 9:1).[137] In Dunbartonshire in 1794 it was common to churn the cream for butter, although it was usually three days old when this was done, so that the butter was of low quality.[138] The skimmed milk was made into cheese. A considerable amount of butter was salted. Here, as elsewhere, the plunge churn was the usual type, but at Balloch a water-powered churn was in use.[139] In Dunbartonshire it was the farms 6 - 8 miles from Glasgow which specialised in butter, and buttermilk and those further away which made butter and skimmed-milk cheese.[140] In Lanarkshire dairying had first become popular in favourable locations but, because fresh butter sold very well, it had spread to the high pastures.[141] In the most populous areas buttermilk was in demand to feed the poor, so the whole milk was churned.[142] In the upper part of Renfrewshire, dairying was paramount, and butter and buttermilk were taken from Mearns, Eaglesham, Neilston and Lochwinnoch to be sold in Glasgow, Paisley and Greenock.[143] In Stirlingshire in 1796 butter was made in summer and autumn and sold fresh in local manufacturing villages and in Glasgow, Stirling and Falkirk.[144] Autumn butter was salted and sold in Edinburgh and Glasgow.[145] Only cream was used to make butter, and the buttermilk was sold too, although a few 'gentlemen' had fed it to pigs.[146] Butter was made in Fenwick and Kirkoswald, and in Kirkmichael for private use, although dairying was not much attended to.[147] Stair was renowned for good butter, and much was made in Tarbolton.[148] By the 1830s Campsie had long been famed for its butter, and in Campsie and Kilsyth, butter and buttermilk were produced for sale in Glasgow and Kilsyth respectively.[149]

All the milk in New Kilpatrick was churned and sent as butter and buttermilk the 11 - 12 miles to Glasgow.[150] Cumbernauld butter was sold in Glasgow and Falkirk and hardly any cheese was made.[151] In Cambuslang it was found to be more profitable to make butter rather than cheese.[152] In Old Kilpatrick fresh milk and butter were sold in the villages and towns and this was more profitable than cheese-making.[153] In Kilbarchan milk, butter and butter milk were produced, and there and in Eaglesham a pattern of zoning was evident.[154] Near the market in Kilbarchan, the whole milk was made into butter and was sold together with buttermilk. Further away salted butter was made for sale in winter. Buttermilk was taken to Glasgow and Rutherglen from East Kilbride, and to Glasgow and Paisley from Mearns.[155] In Abbey parish too the milk was sold as butter and buttermilk, but close to towns and villages the cream only was churned and skimmed milk sold separately.[156] In Hamilton butter and buttermilk were made, but 110 cows were kept for whole milk.[157] In Cadder most farmers had churns and produced fresh milk as well as butter and buttermilk in large quantities for Glasgow.[158] In Cambuslang butter was the most profitable use for milk (see table 9:2) and it was sold in Glasgow (see map 9:2).[159] By the 1860s little butter was made in Ayrshire except for local consumption.[160] Renfrewshire and Lanarkshire concentrated more on butter.[161] Market conditions dictated whether a farmer churned the whole milk for butter and butter-milk or churned the cream alone. Skimmed milk was sometimes made into cheese, and butter milk could almost always be sold. Butter had traditionally been considered to be more profitable than cheese, but cheese prices had risen sufficiently to alter this situation. Some farmers made butter and, "half and half, three-fourths-full or nearly full-milk" cheese.[162]

Table 9:2

RELATIVE PROFITS ON DAIRY OPERATIONS

Figures based on use of 160 quarts of milk (Scots)

1.	Milk is worth 3d per pint (Scots)		
	Fresh milk	Value	£1
2.	10 lb butter @ 1/-	=	10/-
	160 qts butter-milk @ ½d	=	6/8
	Butter/butter-milk	Value	16/8
3.	10 lb butter @ 1/-	=	10/-
	1 stone cheese @ 5/-	=	5/-
	12 qts butter-milk @ ½d	=	6d
	100 qts weak whey @ 1d/gall	=	6¾d
	Butter/skimmed milk cheese	Value	16/0¾
4.	24 lb cheese @ 5d	=	10/-
	120 qts whey @ 2d/gall	=	1/3
	Whole milk cheese	Value	11/3

N.S.A. Vol VI p.436

A.4 Fresh Milk

Cows were kept in town dairies in Edinburgh and Glasgow to produce fresh milk for local consumption.[163] The first Glasgow dairy was opened by William Harley and was operating in 1814.[164] The cows were Ayrshires (about 120 of them) and great care was given to their feeding, health and grooming, and to the flavour and cleanliness of the milk. The dairy provided a reliable source of good-quality fresh milk throughout the year, whereas previously milk had been scarce and of uneven quality.[165] In 1794 Dumbarton was supplied with milk by about 60 cows kept in the town, pastured on the common and fed on draff from local breweries.[166]

Town dairies were not the only suppliers of milk to urban areas (see maps 9:1 and 9:2). Farmers living close by produced milk for sale in towns and villages. In Dunbartonshire in 1811 farmers near the manufacturing villages sold milk there, and in Stirlingshire in 1796 the best pastures near towns and manufacturing villages went to milk cows, and they were fed on subsidiary food from local distilleries and breweries.[167] In Lanarkshire too in 1813 milk cows were given the best pasture, and the milk season was extended, after the grass had failed, by use of turnips.[168] Large numbers of cows were kept near Glasgow. In Ayrshire in 1811 fresh milk could be sold locally at 4d - 6d per Scotch pint, but at 6d - 8d in large towns.[169] This was the most profitable use for milk and saved the effort of making butter or cheese.[170] In Renfrewshire the sale of fresh milk was not mentioned and in Argyllshire milk does not seem to have been marketed at all (indeed there were few suitable markets) but it was produced for family use. Farmers close to Glasgow in Cathcart parish made good profits by marketing fresh milk.[172] Milk was also sold

from Eaglesham.[173] 200 cows were kept in and near Airdrie to supply the local inhabitants with milk, and they also dunged the nearby fields.[174] Milk was taken from Nielston to Glasgow and Paisley in barrels by cart.[175] The opening up of the railway system must have permitted many farmers beyond carting distance to produce fresh milk for sale in Glasgow. Whetham suggests that such farmers entered the fresh milk market from the late 1840s.[176] The trade was, however, risky before artificial cooling was developed and 'railway' milk did not command as high a price as that from a town dairy.[177] By the 1860s Lanarkshire farms were sending fresh milk from the upper ward by rail to Glasgow.[178] It is likely that an increasing number of farmers at a distance from the city had the option of producing fresh milk for sale as transport facilities improved and urban markets increased.

A.5 Dairy Cattle

The agricultural censuses provide no information on dairying operations although they list numbers of milk cows. The overall trend throughout the period was one of increase and in all counties the numbers in 1874 were higher than those of 1854 (see table 9:3). The biggest increase was in Dunbartonshire. There appears to have been no overall trend although each county experienced an increase in 1871 and 1872. This lack of co-ordination may point to the operation of local circumstances or, more probably, to the changing fortunes of different branches of the dairying industry. The fact that numbers increased is probably linked to rising human population and to the growing importance of an operation in which foriegn competitors as yet offered little threat.[179] It is also possible that living standards were improving, as a result of industrial wages

rising faster than inflation, and that this caused an increased demand for protein products.[180]

Map 9:3 shows the number of acres per milk cow in each parish in 1870. The highest concentrations of milk cows were found in and around the urban areas. In the towns themselves, urban dairies must have played an important part in the production of fresh milk. Much of Ayrshire and Lanarkshire shows high concentrations of dairy cows, and it is likely that these were the cheese, butter and veal producing areas. The uplands have mainly low concentrations of milk cows, probably only sufficient to cater for local demand. An interesting similarity can be seen between the distribution of milk cows and pigs (map 10:5). Almost the reverse pattern can be seen in the case of sheep; the uplands carrying very high densities of this animal. It must also be remembered that the presence of much unimproved land in a parish could greatly distort the picture. The distribution maps must, therefore, be considered only as a rough indication of the varying importance of particular livestock enterprises.

A.6 A Model of Dairy Farming

The evidence of dairying has been used to produce a locational model based on a hypothetical town (see diagram 9:4). It is postulated that, since it required no processing, fresh milk sales would be the preferred way of disposing of milk. Such an opportunity would be open only to farmers close to urban areas, as milk has a short life span and did not travel well. Next in popularity would have come butter and butter-milk. This gave a relatively fast return, and both commodities could find a ready market in urban areas. They could be carried further than fresh milk, but in the days before refridgeration, could travel only a limited distance. The making of butter

MAP 9:3

ACRES PER MILK COW 1870

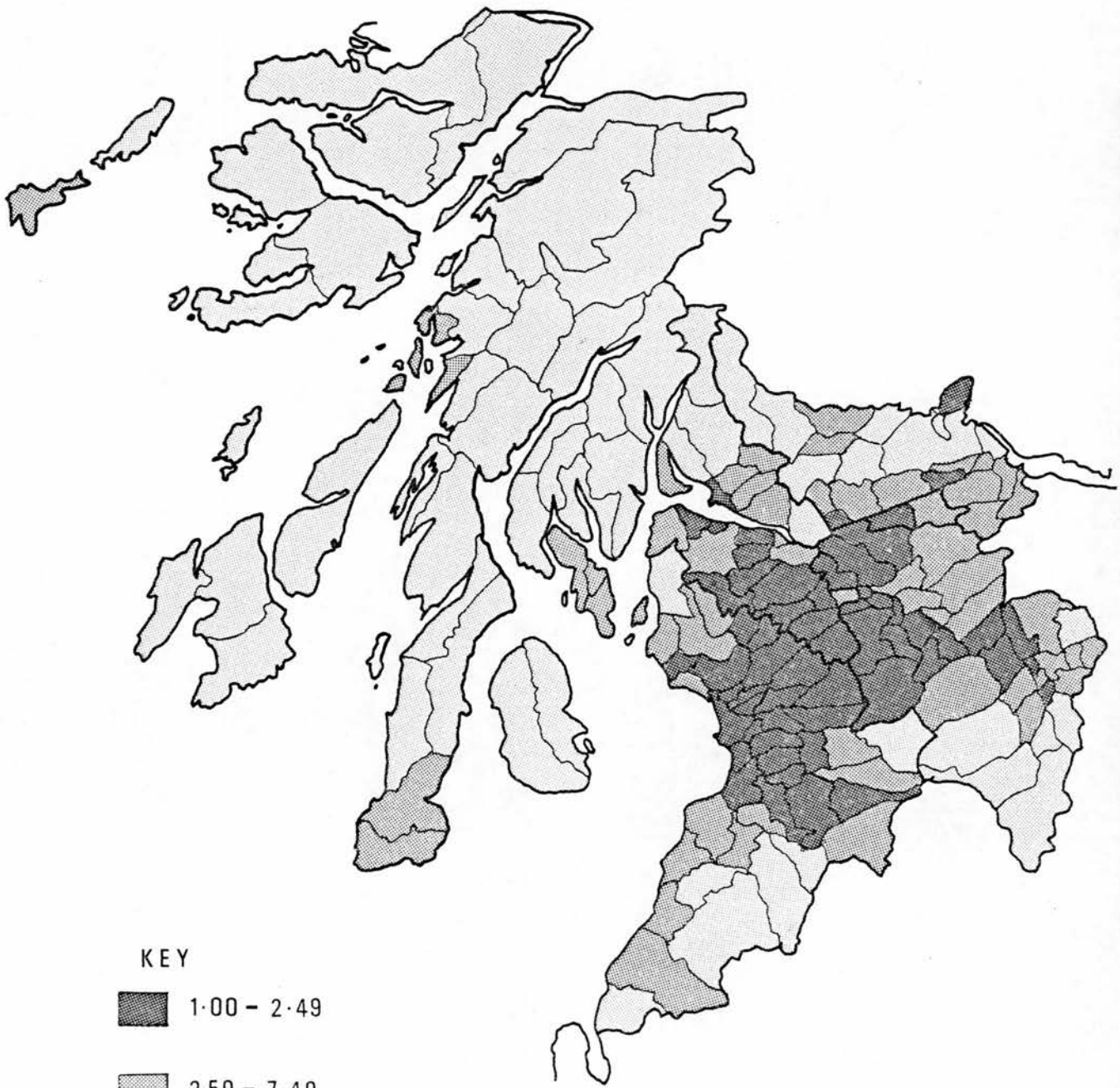


Table 9:3

MILK COWS

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	19338	39140	2805	4792	30528	11516	8282
1855	18796	39286	2805	5110	30186	11621	8721
1856	18651	38670	2716	5274	31309	11414	8524
1857	19440	38477	2721	5159	29971	11533	8636
1866	23434	42011	3682	5094	30372	12566	8001
1867	22109	42012	3328	5907	31829	13610	9188
1868	21842	41775	3063	5728	31863	13387	9030
1869	21995	41898	2991	5918	31545	13368	8716
1870	21841	43141	2892	5854	32101	12379	8871
1871	22417	44353	3048	6093	33619	13716	9350
1872	22740	45717	3140	6262	34501	14562	9668
1873	23565	45204	3009	6155	33523	14577	9500
1874	22938	44062	3062	6182	33295	14720	9456

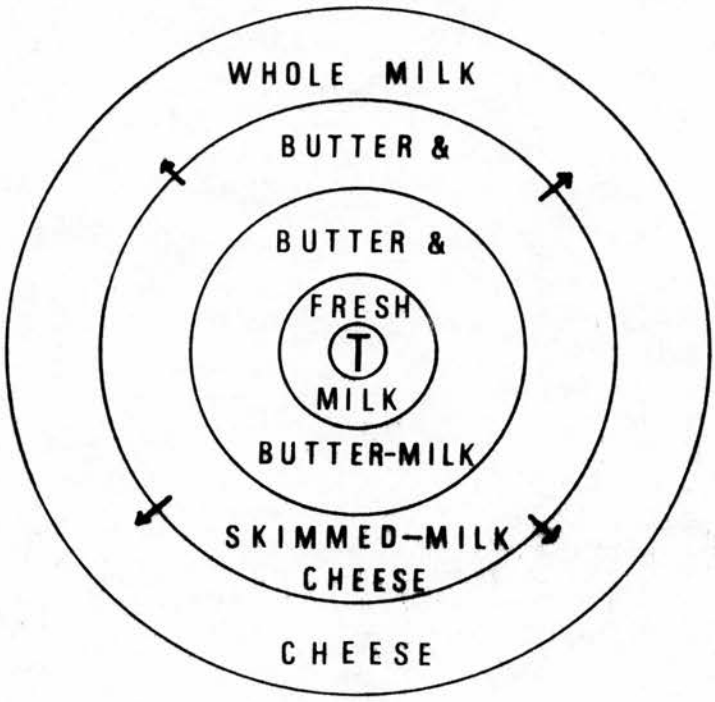
and skimmed-milk cheese could be carried out in an area beyond which it was not possible to carry buttermilk. As an alternative to this zone, and extending beyond it, whole-milk cheese production could take place. This did not give as rapid a return as butter-making, but cheese was much less perishable, could be carried further, and could be kept if it did not sell immediately. The arrangement of these zones and their relative importance in a specific example would depend upon local conditions and particularly on transport facilities and price. The changing profitability of the various operations must have altered the balance of production, subject to the skills of the dairymaid. As transport facilities improved, the area over which farmers could have participated in the most profitable operation must have increased.

This simplified model accorded well with reality in and around Glasgow during the period of study (see diagram 9:5). In the 1790s dairying was practiced in the central belt which excluded Argyllshire and southern Ayrshire and Lanarkshire (see map 9:1). Fresh milk production was concentrated in a handful of parishes lying close to the market, and extending for a radius of approximately $1\frac{1}{2}$ miles from the city. Three parishes were known to produce butter and buttermilk and these too lay very close to Glasgow, although there is no evidence of them lying outside the fresh milk belt. Butter and skimmed-milk cheese were produced in several parishes lying beyond the zone of fresh milk production. Full-milk cheese production was concentrated largely in North Ayrshire where the method had first been introduced.

By the 1830s there was evidence of dairying in a wider area although it was still concentrated in the central belt (see map 9:2).

DIAGRAM 9:4

IDEALISED MODEL OF LOCATION OF DAIRY OPERATIONS



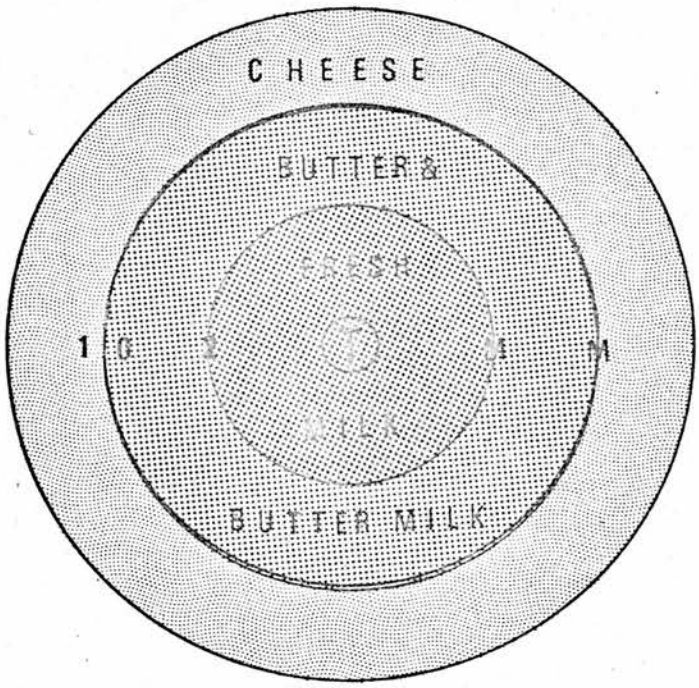
KEY

T TOWN

→ ZONES MERGE

DIAGRAM 9:5

LOCATION OF DAIRYING ROUND GLASGOW & PAISLEY c 1813



KEY

T TOWN

M MILES

VALUE OF MILK PER SCOTS PINT SOLD AS :-

CHEESE	3d
BUTTER & BUTTER MILK	4d
FRESH MILK	6d

from J. Sinclair (1813)
vol 1 p 169

Fresh milk was produced in numerous parishes in the urban areas and it was frequently stated that it was sold in the parish concerned. Butter and buttermilk were produced in parishes lying roughly in a ring round Glasgow, and skimmed-milk cheese was produced in a handful of parishes on the edge of this ring and also in a few East Lanarkshire parishes remote from market centres. Full-milk cheese production had extended over much of Ayrshire and Lanarkshire and even into Argyllshire and Buteshire. It appears to have ousted skimmed-milk cheese in these areas, probably because of market preference.

Although the model does not entirely accord with reality it does correspond with it in general terms. It must be remembered that we are dealing with a number of markets of different sizes scattered throughout the area, and the model considers the effect of only one isolated market. The model is a very simplified one, but it is a useful aid to beginning to understand the complex nature of the dairying industry. The N.S.A. for Cambuslang provides an estimate for the income to be obtained from different uses of milk supplies (see table 9:2).[181] One may infer that the most profitable course was to sell the milk fresh at a yield of £1. Next most lucrative was butter-making which gave 16/8d, but the production of butter and cheese was only a little less so at 16/0¾d, although it seems a little improbable that the same quanitity of butter was produced as when butter alone was made. The making of whole-milk cheese was much less profitable as it yielded only 11/3d. Clearly the relative profitability would have depended on prices and these fluctuated from year to year and season to season. The N.S.A. for East Kilbride and a Report of 1878 cite some examples of butter and cheese prices (see table 9:6), and it can be seen that for some years the gap between the profitability

of butter and cheese making would have closed.[182] For the early nineteenth century, Sinclair gives the profit of fresh milk as 6d per pint, of butter and butter-milk at 4d per pint of milk and of cheese at 3d per pint of milk used (see diagram 9:5).[183]

At first it was hoped to fit veal production into the model of dairy farming, but it was clear that it did not fall easily into the pattern. As a highly profitable outlet for milk, at face value veal production should have been the operation of first choice. The N.S.A. for Cambuslang indicates that a 20-day-old veal calf would sell at £1.16/- and even allowing that the calf might have been sold at birth for 10/- this would give c10/- profit over and above that of butter making, and even c6/- more than in fresh milk production. It is hard therefore to see why every farmer did not concentrate on veal production, whereas in reality it was found in a few parishes situated at a distance from the markets and between Edinburgh and Glasgow. Although lucrative, veal production was possible for relatively few weeks in the year (the calves were sold off at a maximum of 8-10 weeks old),[184] but for the rest of the year presumably the milk could have been used for one of the less profitable enterprises. It is likely that calves were kept for a short period in many of the dairying areas, and that this proved a lucrative if short-lived side-line to cheese and butter production and that a similar but opposite trend occured in the veal-producing areas.[185] Its importance must have been eclipsed by the longer-lasting season of butter and cheese production. It may be that some farmers preferred to sell calves off at or soon after birth, and to indulge in the less profitable but more certain practice of cheese and butter production, rather than risking all their profit should the calf die. In addition, their position as producers of these commodities might have been undermined if there was

Table 9:6

PRICES OF DAIRY PRODUCE

Prices of Butter and Cheese in East Kilbride

	Cheese	Butter
1835	45/- cwt	10d lb
1836	52/6 cwt	11d lb
1837	50/- cwt	10d lb
1838	50/- cwt	11d lb
1839	55/- cwt	11d lb
1840	50/- cwt	11d lb

N.S.A. Vol VI p.896

Report on the Present State of the Agriculture of Scotland

1.	600 galls milk @ 10d	£25. 0.0
2.	240 lb butter @ 1/4	£16. 0.0
	Buttermilk	£ 3.10.0
		£19.10.0

an interruption in the supply for a few weeks while they produced veal calves. It is also interesting to note that the famous veal-producing parishes (they obtained a higher price for their calves simply because of their reputation[186]) lay between Edinburgh and Glasgow, and it may have been that the market was an erratic one, and that a concentration of veal-production was seen as a worthwhile risk only if access to the two substantial and prosperous market centres was feasible. Even today veal is a meat for rather specialised tastes, mostly to be found in 'better class' butchers' shops. It is likely too that these remote areas had little advantage in cheese production being so far from major markets, but the more profitable veal could better bear the cost of transportation. Another factor might have been seasonal demand. Aiton considered that veal was more in demand in winter and spring, and it is likely that many farmers produced it at this time before beginning their dairy operations on a large scale.[187]

The reality then would seem to be a matter of emphasis. Whether farmers concentrated on veal or on butter and cheese, it is likely that they produced at least some of the other commodity. They would have been known for their major product, and this was presumably dictated by factors such as those outlined above. The system must have been a flexible one at this level, depending to some extent on prices and on market demand. The involvement in fresh milk production depended less on this and more on transport facilities and location, but it was another option for those farmers who had easy access to markets. The patterns of production in the dairying industry were, therefore, not static. There were variations from farm to farm, from parish to parish and from year to year. There must also have been variations on a single farm from season to season.

B. BEEF CATTLE

Another aspect of the livestock industry was the production of beef cattle. Farmers wishing to do this could not indulge in dairying as the milk was needed to ensure that healthy, sturdy calves were reared.[1] It was not wise to scrimp on milk rations of calves kept for rearing. Generally cattle rearing is found at a distance from markets, because nearer to them whole milk has a high sale value and rents may be high.[2] The area which was close enough to a market to indulge in these more lucrative enterprises must have changed in accordance with transport facilities and costs. Cattle-rearing is, in many areas, an alternative to sheep-rearing, although sheep can survive on land where cattle would starve.[3]

Beef production was practiced extensively in the study area. In Carrick in 1793 Galloway cattle predominated; they were hardy, fattened easily and gave excellent beef.[4] They were driven to England at three or four years old. Cows were wintered in Dunbartonshire after being bought from Highland graziers in summer; they were sold at the Falkirk tryst to graziers in the following year.[5] Black cattle were also wintered on the coarse high ground of east Lanarkshire.[6] From May to August the grass was left, then it was cut for winter fodder and stocked with young Highland cattle.[7] In Stirlingshire too, cattle were brought from the breeding districts of the north and west Highlands for winter fattening.[8] Some cattle were fattened on turnips in Lanarkshire and Dunbartonshire, while others were fed on draff in Dumbarton and Kirkintilloch.[9] Enclosed land out of lease in Lanarkshire was sometimes let for fattening, and there was much sheltered grazing with good fodder in Kilmaronock, Dumbarton and East and West Kilpatrick which gave better rents than if it was

in tillage.[10] In Lochaber, Sunart and Morvern there were numerous Highland cattle, and excellent ones were bred by Campbell of Barcaldine and Campbell of Balivoalan.[11] The valleys from Lochgilphead to Inverary were stocked with cattle.[12] In Kintyre cattle were thin and, like all the livestock there, in poor condition.[13] In the 1790s there was much pasture for cattle in Kildalton, but it was felt that the land might have been better applied to arable farming.[14] In Appin there were only sufficient cattle for family use and in Luss there were few more than this.[15] In some parishes the preparation of cattle for market was a major interest. Although many animals were of poor quality, feeding beasts for Scottish and English markets was an important occupation in North Knapdale, and Netherlorn was stocked almost entirely with black cattle.[16] The export of black cattle to the mainland was important in Kilmorie, Kingarth and Kilbride.[17] In Kingarth (and possibly in the other two parishes as well) the quality of the cattle was poor as they were scantily fed when young.[18] In Kilchonan, as elsewhere in Islay, cattle rearing was very important.[19] Indeed, Islay had been one of the earliest areas of the west Highlands to supply cattle to the Glasgow market, in the early seventeenth century.[20] Islay cattle were driven to Dumbarton, Falkirk and even to England.[21] Kilarrow cattle fetched a good price from mainland drovers and Mull was also famous for its hardy black cattle.[22] Those of Lochgoilhead were sold at Falkirk and Crieff to English drovers at three to four years old.[23] Cattle from this parish were also sold in Glasgow, Paisley, Greenock and Dumbarton.[24] The small cattle of Ardchattan were also favoured by the English drovers.[25] Many cattle were brought to Bonhill and New Kilpatrick at the start of summer and were killed at the end of the season or after a year's fattening.[26] Cattle from Girvan were mostly driven to England,

but some were fattened locally.[27]

In Dailly the rearing and feeding of cattle was the most profitable occupation for the farmer.[28] Galloways sometimes crossed with Irish and Argyllshire cattle were the usual stock.[29] Most were bought by English drovers. Ballantrae too was largely devoted to feeding cattle and sheep.[30] The cows were sold at two and a half years old and moved around until they were four to five years old when they were sold at St. Faith and Hampton fairs in South East England.[31] In Barr and Girvan too, beef cattle were a major object of attention, and the pastures of West Kilbride were reputed to produce fine beef.[32] Kirkmichael too raised cows for the English market.[33]

In many parishes the quality of the cattle was poor. In Gigha and Cara cattle numbers far exceeded the ancient soumings, so their quality is unlikely to have been high.[34] In Campbeltown cattle were very poor, and in Jura and Kilfinnan the pastures were badly overstocked.[35] In Buchanan tenants kept one third more cattle than they could pasture.[36] One David Dun had set an example to the farmers of Campsie and Fintry by keeping only high quality beasts and never overstocking his land.[37] In other areas too the quality of cattle was improving. In Kilchrennan and Glenorchy people were beginning to keep fewer but better cattle and in Colonsay black cattle occupied the best land.[38] Recently fine cattle had been raised in Tiree, although in the past many of them had contracted "murrain" by feeding on poor pasture.[39] In Inverary there were good-quality Highland cattle together with some Galloway and Lancashire ones.[40] Cattle in Old Kikpatrick were of the best kind.[41] In Houston a few young cattle were raised on poor pasture on the moors but none in the lowlands.[42] Grazing of beef cattle was practiced in Kilbarchan in areas most distant from the market and in Neilston they were kept on the higher

ground.[43] Part of Greenock was used for grazing black cattle.[44] In Dalry there were several grazing farms on which Highland cows were fattened or young stock reared.[45] Cattle were fattened on the lower ground in Largs for Greenock and other nearby towns.[46] In Dalserf a few cattle were fed on the best enclosed pastures for slaughter.[47]

Most cows in Renfrewshire seem to have been of the milk type.[48] In Kilsyth grazing of Highland cattle was as important as dairying, and in Campsie black cattle were kept for the dairy and for the butcher; they originated in Argyllshire and the islands.[49] In Strathblane too dairying and fattening were combined.[50] Many Highland cattle were kept for about one year then sold in Glasgow and Paisley.[51] In Kippen cows were of prime importance and, since enclosure had had no competition from sheep.[52] In Symington relatively few cattle were fattened, but since this involved less work than dairying it was often felt to be more advantageous.[53] In Dundonald and Kirkoswald black cattle were fed for market despite the increasing importance of dairying.[54] In Hamilton fattening was sometimes preferred to dairying because it required less outlay and less trouble.[55]

Many upland parishes had been stocked with cattle before sheep became important,and in some of them both types of stock were kept and were often grazed together. The hills of Kilfinichen and Dunoon were stocked with sheep, and sheep had virtually banished cattle from Inverchoalain and Arrochar although there were some cattle in Inverchoalain which grazed with them on the hills in summer.[56] In Killearn and Campsie there were sheep as well as cattle, and in Fintry they occupied both hill and dale.[57] Farmers bought Highland cattle in May and after a summer's fattening sold them in autumn.[58] There was insufficient pasture to provide winter grazing. Sheep and cattle were raised in Culter and Crawfordjohn and sold to several Scottish markets.[59]

Sheep and cattle fed on turnips were sent to Glasgow from Dunsyre.[60]

In 1813 black and Highland cattle were still important in Argyllshire.[61] They had been the major export of the county and retained their importance in lower arable areas and where the hills were not extensive enough for sheep.[62] Many farms were still overstocked but the breed was slowly improving. Animals were sold off to English buyers at six years old.[63] In Coll black cattle were the main stock because it was thought too wet for sheep and in Mull the small tenants reared and sold black cattle to pay their rents.[64] Cattle were still bought at Falkirk and Doune markets for wintering in Dunbartonshire.[65] Farms for wintering and summering were separate. The cattle were bought at two to two and a half years old and sold at three, but previously they had been kept until four or five.[66] Smaller numbers were kept for summer fattening and for subsequent sale to Glasgow butchers.[67] In Bute and Cumbrae in 1816 two thirds of the cattle were of the Argyll or Galloway breed, and most of those in Arran were of this type, although the pasture was overstocked and in common.[68] In Lanarkshire too cattle were fattened in summer and winter and enclosed land out of lease was let for this purpose.[69] The uplands of Stirlingshire were grazing districts used to fatten Highland cattle for the butcher in summer.[70] Cattle were also wintered then sold off for the markets of the Lowlands and of England.[71] The wintering area was in the west of the county where there were sheltered woods and ravines.[72] Cows were also fed for the butcher in strawyards, sheds and at distilleries.[73] In Renfrewshire fattening was of little importance, although a few cows were fattened round "gentlemen's seats" and at the distilleries of Inchinnan and Paisley for the Paisley, Greenock and Glasgow markets.[74] In the dairying county of Ayrshire, some Galloways were raised for beef and were

popular with the English graziers, although dairy cows were quickly replacing them.[75]

In the 1830s beef cattle were still important in Argyllshire. In Ardchattan local cows produced good beef and fattened easily, and the same native Argyll breed was kept in several parishes.[76] In Glenorchy rearing was more profitable than dairying.[77] There were 1,000 - 1,200 cattle sold annually from Jura.[78] Tiree cows were still inferior to those of Coll because there was little winter pasture for them.[79] In Cumbrae, Kingarth and Rothesay black cattle were important, although not exclusively.[80] In Kilbride the breed was improving as the landlords distributed bulls among the tenants to improve their stock, and in Kilmorie the proprietors' enthusiasm had been copied by the tenants who showed great interest in improving the cattle.[81] In Roseneath, Dunbartonshire, there was much parkland used for grazing Argyll cattle, and in the uplands of Old and New Kilpatrick black cattle were fattened.[82] The moorland pastures of Cardross and Rhu grazed cattle and sheep from the West Highlands.[83] Young cattle were also taken to Arrochar, Luss, and Kilmaronock for fattening.[84] In all these parishes dairying was also of considerable importance. In some parts of Lanarkshire dairying had almost entirely superceded fattening.[85] In Douglas and Cambuslang, however, there were as many non-dairy as there were dairy cows.[86] In Dolphinton cattle had been kept for rearing and fattening, but dairy stock had replaced them.[87] There were extensive feeding sheds in Cambusnethan at Lord Belhaven's new distillery.[88] West Highland cattle were still fattened on the hills of Campsie, and cows were fattened in Fintry although the price was very variable.[89] There were fat cattle as well as the dairy stock in Killearn, Kilsyth and Strathblane.[90] Cows were still taken to Falkirk from the north and west Highlands,

Table 9:7

NON-MILK COWS

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	40894	43255	4582	7660	28427	11233	18985
1855	41582	44722	4610	8034	30515	11892	20391
1856	41000	44021	4706	7765	30113	10939	20006
1857	42103	42933	4681	7542	29137	10865	20077
1866	34397	33533	4570	5470	25834	8947	13395
1867	34799	37828	4437	6480	26265	9813	15073
1868	34210	37984	4487	6989	28114	10028	16817
1869	31899	35303	4494	5905	25061	9315	15953
1870	34799	40220	4459	6212	27776	9796	17695
1871	36405	43835	4624	7185	30536	11082	19884
1872	38483	47547	4729	7861	32850	11730	21065
1873	40978	47592	4612	7717	34305	11936	21010
1874	40529	46530	4608	7438	33598	11528	21382

N.B. 1854-7 Non-milk cows and calves listed

1866-74 Cows of two years old and above and of less than two years old listed

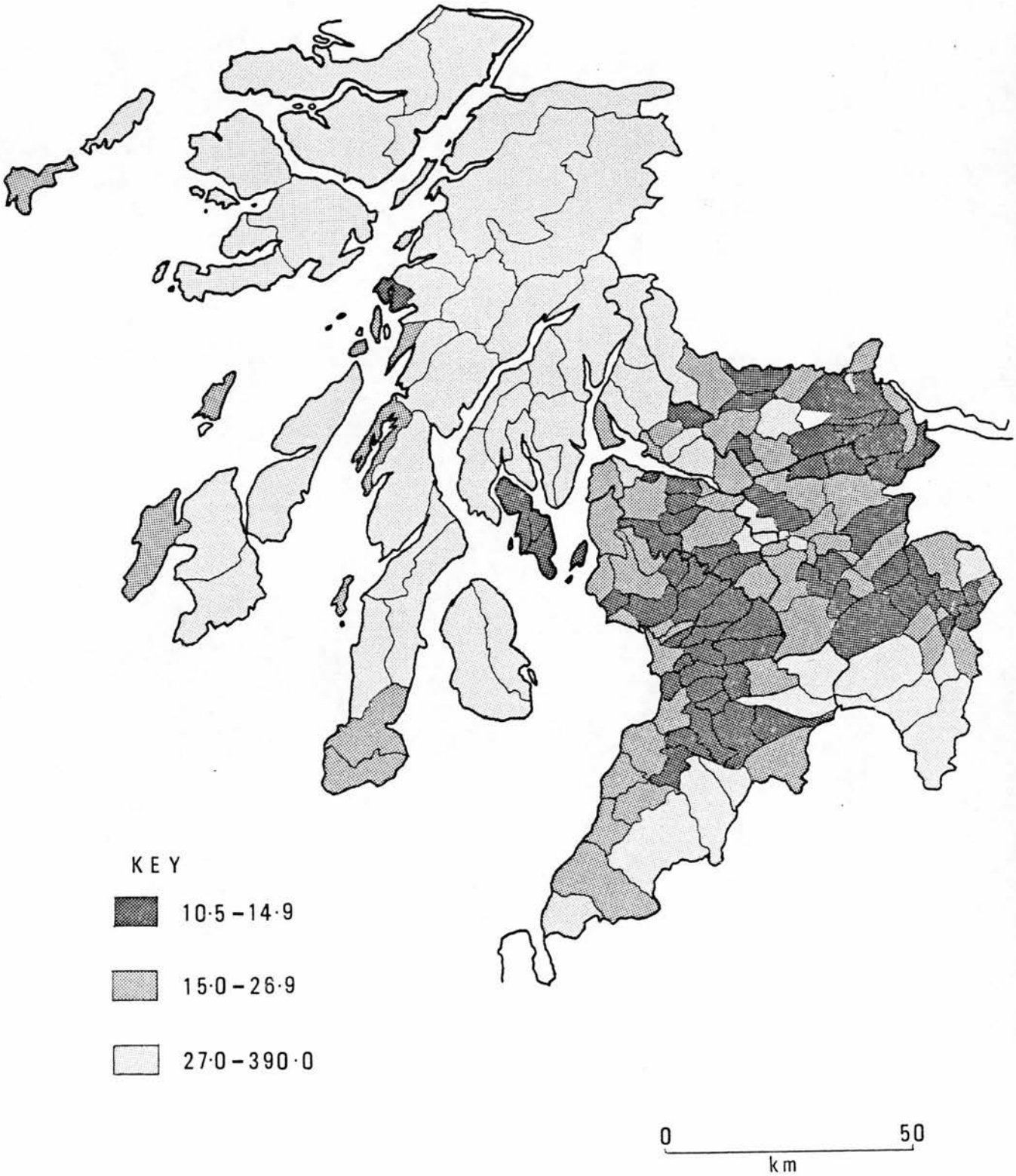
Numbers have been added to give above figures

and the famous tryst seems to have continued as before.[91] In Barr black cattle had retained their importance although a few dairies were being set up.[92] The higher land in Colmonell was given over to fattening cattle and sheep and there were three times as many Galloway as Ayrshire cows.[93] In Coylton too the uplands were used for cattle fattening, and there were some beef cattle in Dailly, Dalmellington, Dunlop (the famous dairying parish) and Ochiltree.[94] In Maybole and St. Quivox it was observed that the Ayrshire breed was suitable for the butcher as well as for the dairy, and this is probably what happened in the four parishes mentioned above.[95] In Straiton although the Ayrshire cow had superceded the Galloway, Galloway bulls had been retained so that the stock would suit the English market.[96] In Lochwinnoch some farmers fattened Ayrshires for Paisley and Glasgow.[97] In the 1860s in Lanarkshire Shorthorn bulls were used to serve Ayrshire cows so that the offspring would be suitable for beef fattening. They were sold to the butcher at 2-3 years old.[98]

There were substantial numbers of non-milk cows in all counties from 1854 to 1874.[99] A problem in interpreting these figures is the different method of classification used from 1854-7 and 1866-74 (see table 9:7). Despite this, the difference in the figures for 1854 and 1874 is small, and some counties experienced an increase, others a decrease. The counties followed the same trends in 1855 and 1856, 1867 and 1869-72, as well as in 1866 when the decrease may have been due to changes in the method and season of collection. The increase of 1867 may have been due to the returns being taken in June instead of March, as in 1866, and the fall in 1869 was probably due to the failure of turnips and winter fodder in 1868.[100] The increase from 1870 probably exemplifies the swing towards pastoral farming.

MAP 9:4

ACRES PER NON-MILK COW 1870



Certainly in 1873 it was stated that more cattle and sheep were reared, and this was reiterated in 1874.[101] The decline of 1874 may have been due to unfavourable conditions, or the impact of Australian imports may have begun to be felt.

Throughout the period then, beef cattle were kept over a wide area. In some instances they were seen as an alternative to sheep and were occasionally superceded by this animal. In other areas dairy cattle rivalled beef for the main interest of farmers. In many parishes several livestock enterprises were practised, and the degree of emphasis on any particular one must have depended on market forces as well as on the land's adaptability. During the period of study there seems to have been a growing awareness of the importance of good quality stock and an increasing emphasis on their condition rather than on crude numbers. This must have been encouraged by the growing interest in vetinary science and scientific agricultural practice.[102]

The distribution of non-dairy cattle in 1870 can be seen on map 9:4. The highest concentrations of cattle were in the lowland areas. At first sight one might expect the converse to be true. One must, however, bear in mind that the large acreages of unimproved rough country in many upland parishes would tend to 'dilute' the real densities in these areas. It must also be pointed out that most upland parishes had extremely high densities of sheep (see map 10:3), and that the pattern may reflect the subsidiary nature of cattle farming in these areas. The densities of cattle in the lowland areas remind us of the mixed nature of farming in these parishes.

C. WORK OXEN

Oxen have often been used for draught purposes, and the practice

continues in the Far East.[1] In Britain, however, their use began to decline from the seventeenth century, and by the nineteenth century they were of small significance and were particularly rare in well-cultivated areas.[2] Nevertheless, there were those who still preferred the ox; its chief advantage was that it ate less than the horse, and could be sold for beef when its working life was over.[3] The horse, however, could perform much more work in a short time; an important attribute in agricultural work when short periods of favourable weather had to be used to maximum advantage.[4] Some proprietors used oxen, generally by way of a novelty or as an experiment, but the ordinary working farmer, concerned with obtaining the most from his land, seemed rarely to have used them.[5]

Oxen had fallen into disuse in Ayrshire in 1793, and there were none at all in Stirlingshire in 1812.[6] In 1811 there were some working oxen at Ardmore, Dunbartonshire, where they were used for the threshing mill and for carting.[7] Lord Stonefield at Levenside and the Duke of Argyll at Roseneath had used them for carting and ploughing, but had found them inferior to horses.[8] In Lanarkshire oxen had been common, and in 1798 there were a few still in use.[9] Some were used with horses as additional power, and some gentlemen had begun to use oxen again. A Mr. Honeyman of Lanark had used two horses and two oxen to break up moorland.[10]

Work oxen were not listed separately in the agricultural censuses, and in any case their importance by the mid-nineteenth century must have been negligable. By 1793 they were already something of an anachronism, and if they were used at all it was by way of a novelty. They had very little significance in Scottish agriculture during the period of study. It is, however, interesting to note the degree of controversy which existed in the early nineteenth century over their use.

Few agricultural writers would come down categorically in favour of the ox or the horse, and while making it clear that the latter was the normal draught beast, quote examples of gentlemen who profitably used the former. Sinclair points out that many people had been accustomed to using oxen at the start of their career, so the swing towards horses did not take place until the second half of the eighteenth century.[11] It is impossible to judge how far the horse's initial popularity was a matter of fashion, but it is certain that this would not have continued if the animal had not proved itself worthy. It is likely that the ox could not keep up with the pace of late eighteenth-century life, and that for this reason a speedier and more versatile alternative was sought. In a similar way the horse was in turn superceded by the internal combustion engine for carriage and farm work, although there are still one or two farmers who claim the superiority of the horse.

Chapter 10

SHEEP, HORSES AND PIGS.

SHEEP

Sheep have been kept for their meat and/or wool since early times, and their milk too has frequently been valued. There are numerous breeds, the characteristics of which vary according to the purpose for which they are kept, but only a few of these breeds were kept in the study area during the period under consideration.

1. The Native Breed

These were small and white-faced, with wool which varied in colour from white to dark brown,[1] and in 1814 were found on many of the higher pastures north of the Forth, although they were declining in favour of other breeds.[2] The nearest modern equivalent to this type is found in Shetland.[3] They were probably brought to Scotland from Scandinavia by the early settlers.[4] In the late eighteenth century the breed was badly managed, the lambs were allowed little milk, and scant attention was given to the selection of rams.[5] For this reason and because of its smallness the breed was little prized, and was increasingly replaced by other types.

2. The Black-Face (Tweeddale, Linton)

These sheep have plump bodies, black faces and legs, they fatten easily and are extremely hardy.[6] They were said to have been

Table 10:1

SHEEP TERMINOLOGY

Some terms used to refer to sheep:-

MALES	Ram	Male sheep
	Tup	Male sheep
	Ram or tup lambs	Young male sheep taking milk
	Hogs	Young male sheep before shearing
	Dinmond tups or rams	Male sheep when shorn once
	Two sheer rams	Male sheep when shorn twice
	Three sheer rams	Male sheep when shorn three times
	Wether	Castrated sheep (used as prefix for lamb, hog etc.)
FEMALES	Ewe	Female sheep
	Ewe or Gimmer lambs	Young females taking milk
	Ewe or Gimmer hogs	Young females until shorn
	Gimmers	Young females shorn once
	Young ewes	Young females shorn twice
	Two, 3 or 4 shear ewes	Young females shorn more than twice
	Draft, cast, crone, crocks and slack ewes	Aged ewes (sold off from farm)

from Sinclair J. (1814) op.cit.
Vol III p.108

introduced to the Highlands in about 1760 and slowly superceded cattle on the upland pastures.[7] They were renouned for good mutton, but their coarse fleece was less valuable.[8] It was unusual to give them supplementary winter fodder, and the breed survived well on this system.[9]

3. The Cheviot

These are hornless sheep with long, thin bodies and white faces and legs.[10] Their wool is of finer quality than that of the blackface, but they are less hardy, so are common on lower grassy hills rather than on the highest pastures.[11] Their mutton is excellent.[12] They were first kept c1760 in and around the Cheviot hills from which they take their name, but by the early nineteenth century they had spread to several counties.[13]

4. The Leicester

This breed was perfected by Bakewell and the Culleys, and in 1814 was found in small numbers in many Scottish counties.[14] They were used in convertible husbandry because they were docile, early to mature and produced good value meat and wool for a relatively small amount of food.[15]

These breeds were frequently crossed with one another or with the novelty breeds such as Merino or Southdown, thus producing a great variety of types.

Smearing

The smearing of sheep in October or November, usually with tar and butter, was traditional in Scotland, and was still common at the end of the eighteenth century.[16] The proportions of tar and butter

varied, with more tar for younger sheep.[17] Its purpose was to destroy vermin and to provide warmth for the winter.[18] Its value for these purposes was uncertain; it was unknown in Wales and had been discontinued in Northumberland.[19] There was, however, another logical basis for the practice. Smearing increased the quantity of wool by up to 25%, although it lowered the quality. Since blackface wool was of poor quality anyway and was marketed as such, this need not have been a disadvantage.[20] It was even suggested that the English merchants preferred the coarse wool.[21] Naismith certainly believed that coarse wool was in greater demand than fine.[22] It would therefore have been advantageous to increase the quantity produced despite the detrimental effect on quality.

In 1811 storemasters in Ayrshire favoured smearing, and it was therefore almost universal in that county.[23] In Strathblane the whole stock was smeared in November and was felt to benefit from the practice.[24] Butter-milk was often used in the smearing mixture. In Argyllshire, however, as early as 1794 some farmers smeared only the lambs or gimmers, others the whole flock.[25] In Lochgoilhead only the yearlings and rams were smeared.[26] Smearing was still continuing on this basis in 1813 in Argyllshire;[27] the sheep were not kept chiefly for their wool so perhaps some farmers considered smearing their entire flock to be pointless. In Dunbartonshire in 1793 smearing was already restricted to the lambs which were kept for breeding.[28] The war may have been a contributory factor to this, but it had begun to decline before then. By 1812 only yearlings and ewes were smeared, but the practice was declining probably because of the increasing cost of both tar and butter.[29] In Stirlingshire too, only yearlings were smeared due to the high price of tar caused by wartime demands.[30] Previously all stock had been smeared.

Alternative substances began to replace tar and butter for smearing. In Stirlingshire the older sheep were washed with tobacco juice or broom juice.[31] In 1810 it was estimated that washing with tobacco juice cost 2d (1p) per animal compared with 6d ($2\frac{1}{2}$p) for smearing with tar and butter. These alternative substances were good barriers against vermin but did not protect against the cold. Tobacco juice was particularly beneficial against scab.[32] It had been used as early as 1793 for this purpose.[33] In Dunbartonshire tobacco juice, whale oil, turpentine and stale urine had all been used successfully to combat scab and vermin.[34] In Luss the tups, lambs and weaker ewes were smeared, but other sheep were washed with tobacco juice, broom tops etc.[35] Even in Ayrshire where tar and butter were popular, some farmers used tobacco juice and whale oil.[36]

By the late eighteenth century then, the old tradition of smearing sheep with tar and butter was declining. Probably with the increasing sheep population and the introduction of new ideas generally. Some farmers began to question the value of the practice, especially as it was mutton rather than wool which was their prime interest. Many continued with it because it increased the quantity of the coarse wool which was in great demand, but some found the practice no longer profitable when tar prices increased sharply. It is interesting to note that in the Farmers' Register of April 1827, twelve years after the end of the war, it was reported that farmers in Berwickshire and Lammermuir were only just abandoning smearing.[37] The Highland and Agricultural Society published several articles on smearing and on the use of various substances for this purpose.[38] Clearly, during the first half of the nineteenth century farmers were still examining the value of the traditional practice, looking for the optimum quantities of tar and butter to be used, and seeking

alternatives. Tobacco juice began to replace tar and butter as a protection against disease and a variety of other substances was tried. Many of these, like tobacco juice, reflect the availability of industrial by-products and gradually the use of tar and butter must have become increasingly rare. It is worthy of note that Leicesters were not smeared even early in the nineteenth century, and this probably applied to all sheep kept in unexposed situations.[39] Protection against skin disease could be obtained by washing. In addition improved feeding and methods of sheep keeping must have made protection against the cold less necessary. The success with which lowland sheep survived without smearing may have encouraged its discontinuation on the upland pastures. Better-quality wool would suffer more from coating in tar than would the coarser types. It would seem that a combination of factors operated to cause a decline in the traditional practice of smearing sheep with tar and butter. By the 1860s in Lanarkshire, dipping with tobacco juice and olive oil had replaced smearing, and this was probably done elsewhere too before the use of modern antiseptics and chemicals.[40]

Management

A sheep stock could be kept for 1) breeding, 2) breeding and rearing, 3) breeding and fattening.[41] In the first case the object is to keep ewes and to sell off the lambs, keeping only enough to maintain the stock. Such farms are usually small with uniform-quality pasture, and turnip ground to supply the ewes in spring.[42] With breeding and rearing, nearly all the lambs are kept for fattening, and large farms with a variety of pasture are necessary, in the third case all lambs are reared and fattened on the same farm, and again various qualities of pasture are needed.[43]

1790-1830 The White-Face (see map 10:1)

Although sheep had been kept in Scotland for centuries it was in the mid-eighteenth century that commercial sheep farming first developed on a large scale.[44] The White-face had been the traditional breed of sheep and had been kept all over the country but with the new system of farming came new breeds of sheep. Reputedly it was John Campbell of Laguyne who introduced commercial sheep farming to the West Highlands in 1747.[45] The commercial sheep farmers introduced the Blackface and the old White-faced breed began to be superceded. By the 1790s some White-faces were still left but they were losing ground. They were anachronisms and were kept for domestic use, or in areas where commercial sheep farming had not yet developed.

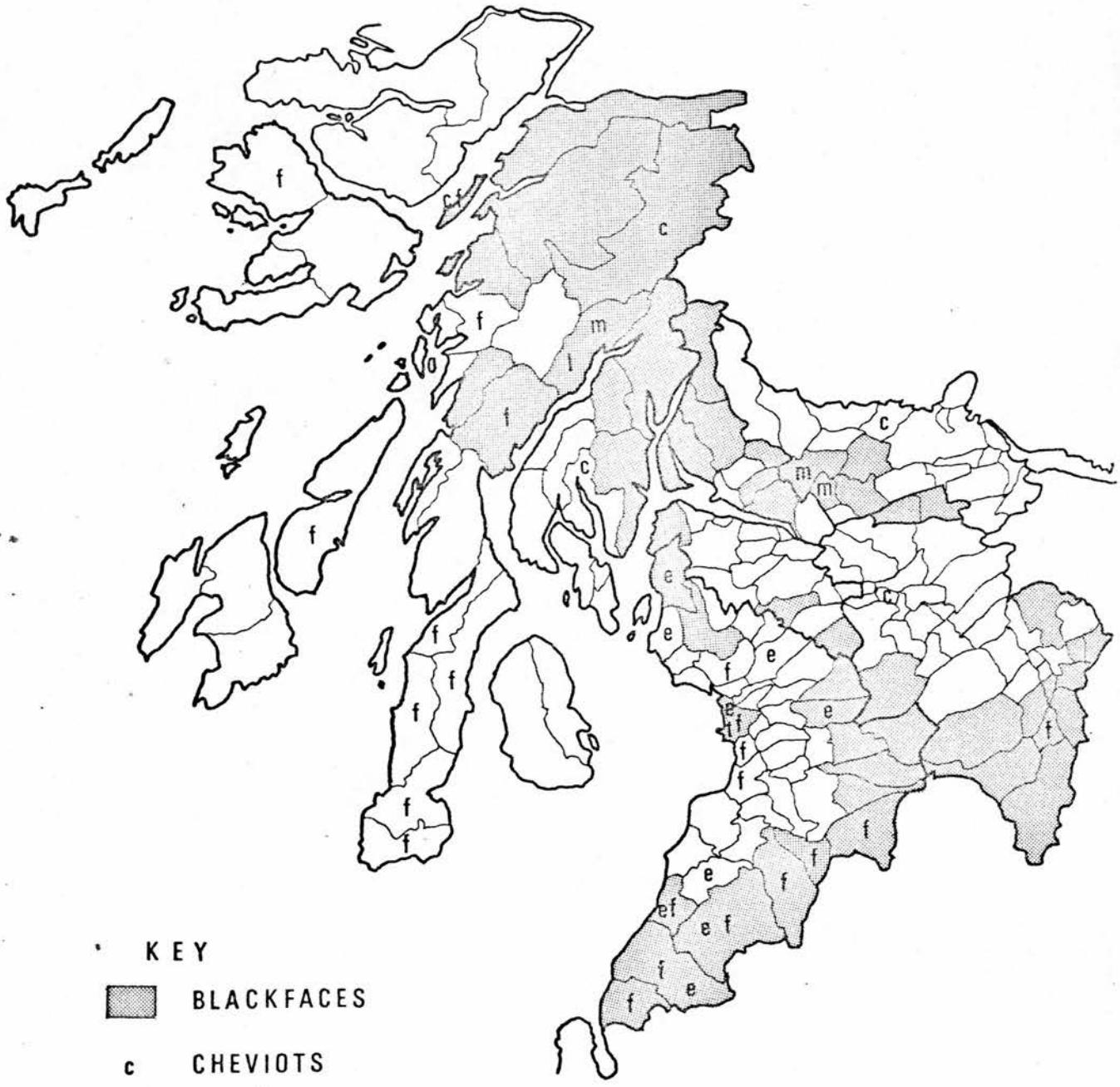
In Argyllshire the Blackface was said to have been introduced only c1770, but already in 1794 it was only the small tenants who kept White-faces.[46] In 1813 the White-faces which did remain were poorly managed and there was no control over breeding.[47] They were given poor pasture on which they were folded in summer and harvest; housing was necessary in winter and spring.[48] The ewes were milked, a practice detrimental to the lambs, and in Kintyre White-faces were housed to obtain manure.[49] They did well on the low heathy hills and mild climate of this area.[50] They were not as highly prized in Campbeltown as in other parts of Kintyre.[51] In Netherlorn too white-faced sheep were housed at night to protect them from foxes and wildcats, and were milked.[52] The small tenants in Kilninver kept White-faces, but there were six upland farms in the parish stocked entirely with sheep, probably Blackfaces.[53] In Kilninian there were both lowland and highland sheep (White-faces and Blackfaces), and in Glassary a few White-faced sheep remained but were kept only by the

smaller tenants and were decreasing in number.[54] In remote Lismore White-faces were housed at night because the pasture was very confined but even here some Cheviots had been introduced.[55] In Killean White-faces were kept for home use and were felt to produce better mutton and finer wool, and to be more disease-resistant than the Black-faces.[56] Similarly in Jura White-faces were being superceded by Black-faces but this was regretted by some at least.[57] In Lochgoilhead, Black-faces were found, but their wool and meat were felt to be greatly inferior to that of the old breed.[58] In North Knapdale too, the passing of the old breed was regretted, and it was pointed out that no attempts had been made to improve the native sheep, and that they might well have proved more suitable for the county than the new breeds, had attention been directed to their improvement.[59] In Arran in 1807 most sheep were White-faces, but they were badly kept and in a starving condition.[60] A Mr. Crawford of Machry and a Mr. Hamilton of Glenluig managed their sheep better, but they had Black-faces.[61] In this instance at least it would seem that the White-face did not have an opportunity to compete on equal terms with the Black-face. Even by 1816 the White-face continued in its unimproved state while the Black-face was kept under a better system.[62]

Isolated examples of the keeping of White-faced sheep came from Lowland areas too. They were found on the dry Ayrshire coastlands c1793 and in Carrick c1811, but the Black-face was the most common Ayrshire breed.[63] Even in Lowland Kilwinning White-faces had been housed at night c1742 thus demonstrating their lack of hardiness in relation to the newer breeds, and a few such sheep were kept on each farm for domestic use, although this had been discontinued in the 1790s.[64] In Lamington, however, there were still some White-faces.[65]

MAP 10:1

SHEEP BREEDS - SOURCE O.S.A.



The Black-face had completely superceded the White-face in Dunbartonshire, and this had happened in many parts of Argyllshire too.[66] The area from Tyndrum to Fort William and from Lochgilphead to Inverary was devoted to large-scale commercial grazing of Black-faces. The flocks were sold to Yorkshire graziers for mutton, not wool, and it was their preferences which dictated the type of sheep kept.[67]

The Black-face

In most upland areas commercial sheep farming was becoming increasingly important. In a late eighteenth-century Scottish context this meant the Black-face. This breed was introduced into Kilmalie in 1764, and by the 1790s sheep pasture occupied about three quarters of the parish, the value of the land had increased three-fold as a result.[68] In Kilmartin extensive hill land had acquired a new value due to the introduction of the Black-face, and in Kilmore and Kilbride sheep (Black-faces) had recently been introduced, and had removed the heath from the hills making them grassy.[69] Large-scale sheep-rearing was also increasing in Lismore and Appin.[70] In Lochgoilhead Black-faces had been introduced 35 years previously and had spread rapidly on the rugged ground despite the limited provision for winter fodder.[71] The wethers were sold off to Glasgow butchers at three years old. Braxy caused heavy losses of up to a quarter of the flock.[72] In Strachur commercial sheep farming had been introduced during the preceeding 30 years, and farms had been amalgamated to form extensive sheep walks.[73] In Dunoon sheep had taken over from black cattle and horses in the mountains, and rents had risen as a result.[74] In Glen-orchy too, sheep had taken over and rich grass was springing up in place of coarse heath on their extensive grazings.[75] The sheep were

mainly Black-faces and had replaced the old small breed. A few Cheviots had been introduced by the Earl of Breadalbane.[76] In Tiree sheep farming was declining but this probably related to the White-faces; the animals did badly because of summer weeds and wet winter pastures.[77] In addition, their numbers had been decimated by bad seasons.[78] In Kilchonan sheep had barely been introduced although the area was felt to be suitable for them.[79] In Kildalton too, sheep farming had hardly begun.[80]

In Lanarkshire pasturing was mainly confined to the hills but here the Black-face was paramount and was preferred by the Yorkshire jobbers no matter how rough the wool.[81] By 1806, however, there were already some Cheviots as well, which were being sold to England as well as to Edinburgh and Glasgow.[82] In Carnwath there were some extensive heath-covered sheep farms suited to breeding and rearing, and in Culter sheep were fattened for sale in Lanark, Hamilton and Glasgow.[83] In Crawfordjohn and on the moors of Avondale likewise sheep were important.[84] In the former, rising sheep prices had caused a decline of the more labour-intensive arable farming. The moors of Lesmahagow pastured Black-face sheep, and grazing was also important in Douglas, Carmichael and Dolphinton.[85]

The Ayrshire moors carried Black-faces too and by 1813 most sheep in the county were Black-faced.[86] The breed had been improved by crossing with sheep from Tweeddale, the original home of the Black-face, and these individuals were particularly popular with English merchants.[87] The valleys and low gound on the coast were arable and concentrated on dairying.[88] In Sorn, Dalry, Fenwick, Largs and Galston the moors were stocked with Black-faces.[89] In Ochiltree black cattle were more important but there were nevertheless three or four large sheep farms on high ground, while Ballantrae, Auchinleck

and Straiton maintained large numbers of sheep.[90] The sheep of Barr were not in the best condition for they pastured with the cattle who poached the surface of the ground and lessened the amount of food available.[91] Black-faces were the commonest breed, and this was also the case in Girvan, Colmonell, Dundonald and Innerkip where they were kept on the moors in summer, and the low ground in winter.[92]

In Dunbartonshire c1793, there were 26,000 Black-faces and great attention was paid locally to improving the stock.[93] Previously it had been the practice to buy sheep at the fairs of Lanark and East Kilbride.[94] By 1811 the numbers were stated to be 28,000, most of which were bred in the county.[95] Heron gave the figure of 30,000 for 1806, all Blackfaces.[96] Sheep were also important in the uplands of Renfrewshire.[97] They were pastured in the upper parts of Old Kilpatrick, and in Arrochar had taken over from black cattle[98] In Rhu sheep had removed heath from the hills and improved the vegetation, and the higher ground of Luss was stocked entirely with sheep.[99] In Renfrewshire of c1812 sheep farming was of small importance. Nevertheless, small flocks of Black-faces were kept on the extensive dry hills of Innerkip, Kilmacolm, Eaglesham and Neilston.[100]

Black-faces were paramount in the uplands of Stirlingshire too, but it was a fattening rather than a rearing area. Most of the sheep were brought from Peebles-shire or the Highlands at 1 year old and kept until 3 or 4 years old. This system was improving the quality of the upland pastures, and the benefits were most obvious in Campsie and Fintry where it had been in use for c50 years.[101] The Black-face had been used on the Campsie Fells; the old-type sheep would not pasture the moors. The sheep were transferred to the low ground in winter.[102] In Strathblane the sheep were chiefly of the Black-faced breed kept for their wool and the lambs.[103] Here and in Fintry the stock was

good and well cared-for.[104] The moors of Killearn were also stocked with Black-faces.[105]

Sheep Versus Arable Farming

In most lowland areas arable farming was paramount and sheep were of little importance. In Dunbartonshire there was a major problem in conveying the sheep from the upland stock farms to the Glasgow market, for tenants up to 20 miles from the city were forbidden to keep sheep because they damaged hedges.[106] Many sheep collapsed from exhaustion en route.[107] In Lanarkshire, however, much enclosed land which was out of lease was used to fatten sheep and cattle, and in winter the stock was fed on turnips.[108] Nevertheless by 1798 enclosures were said to have banished sheep from the lowland areas, but in 1813 the use of land out of lease was again mentioned.[109] In West Monkland enclosures had prevented sheep-keeping and since enclosure sheep farming had ceased in Dalserf.[110]

In Sorn, Avondale and Dalry sheep were rare on enclosed lowlands and because of enclosure were kept only on the moors in Houston.[111] Much of Renfrewshire was enclosed and sheep were rarely mentioned by Martin. However, Fulton of Hartfield's lands in Neilston were suitable for sheep and at Castle Semple there was a large farm which included well-enclosed sheep parks.[112] In lowland and fertile parts of North Ayrshire a few sheep were found on each farm for family use.[113] This was a traditional dairying area conveniently close to Glasgow. Some sheep were found in enclosures round "gentlemen's seats" and one or two in Stevenston for "gentlemen's tables".[114] In Dalziel sheep were kept in parks round the mansions and were fattened at Hamilton Palace, perhaps for domestic consumption, but were not bred in the parish.[115] In Kilmarnock thorn enclosures had almost banished

sheep, and in Kirkmichael and Craigie there were very few sheep.[116] In Symington there were only a few domesticated sheep on enclosed farms.[117] The practice of keeping a few sheep on each farm had almost ended in Cardross and in Bonhill, Blantyre and New Kilpatrick there were relatively few sheep.[118] In Govan there was only one sheep farm and this lay on land which was frequently flooded and was unsuitable for tillage.[119] There were few sheep in Kilbarchan, Eastwood and Kilmacolm.[120]

Rival Breeds

Although the Black-face was extremely popular, other breeds were being introduced in scattered pockets in the early nineteenth century. The Earl of Breadalbane had tried Cheviots in Glenorchy and similar developments were occurring in Inverchaolain.[121] Cheviots had been tried in Bute by Lord Bannatine and in Arran by Captain McAllister, but they were not doing particularly well.[122] Campbell of Aucha had successfully introduced Cheviots on his lowland farm and they had been tried in Lismore.[123] The moors of Gargunnock had been stocked with Cheviots by the proprietor on Sinclair's principle.[124] Although most sheep in Inverary were Black-faces some "Bakewell"English (Leicester?) and one Spanish sheep (Merino?) were found.[125] In Cambuslang too there were some English sheep and some Cheviots as well as Black-faces.[126] Cheviots were slowly being introduced to Barr and to Girvan and here a few had been crossed with English breeds.[127] Black-faces were, however, the most common type. In Colmonell there were a few fine-woolled animals as well as Black-faces and in West Kilbride English sheep were rapidly multiplying, although Black-faces were most common.[128] English sheep had also done well in Largs.[129] In Dailly increasing numbers of sheep were being fed on improved

valley pasture, as well as on the moors, and this may well point to the introduction of a new breed.[130] In Galston and Fenwick there were some English sheep kept on the lowlands for their fine wool.[131] In Dundonald as well there were a few English sheep together with numerous Black-faces and even a Turkish ram and his progeny.[132] In Killearn some Spanish sheep had been successfully introduced in 1793 by one Mr. Dunmore, and Archibald Edmonstone had also used them in Strathblane.[133] Campbell of Combie had tried Cheviots in Argyllshire.[134] Even in Mull, where many of the hills had been converted to sheep-walks, by 1810 Cheviots had become well-established.[135] They were allowed to overgraze and much land degenerated to peat and bracken moor, and they caused much forced emigration.[136]

Summary

The White-faced breed, which had formerly covered the whole area, by the end of the eighteenth century remained only in small pockets, and was a domestic rather than a commercial breed. For commercial purposes it declined in favour of the Black-face, a breed developed for this very purpose. It is possible that the native breed might also have been suitable for commercial farming had it been improved and well managed.[137] However, the new system brought with it new methods, and the old breed of sheep was not given a chance to fit in with it.

As the Black-face was introduced, large-scale commercial sheep rearing spread into most of the upland areas,[138] bringing about a beneficial transformation of the heath-covered pastures, provided they were not overstocked. Mutton was the chief item of interest but the coarse wool was also of value to the Yorkshire graziers who bought most of the sheep.[139] Some of the less valuable lowlands were used

for sheep fattening, but most lowland areas were not involved in the sheep boom. A pattern of specialisation was developing.

The Black-face did not remain unchallenged. The Cheviot was tried by several gentlemen and was frequently crossed with the Black-face in an attempt to get the best qualities of each breed. Other English and foreign breeds were also tried, probably as a novelty or as an attempt to find new and better methods of farming. One suspects that some gentlemen introduced rare breeds into their parks as a talking point or an attempt at one-upmanship, and perhaps they then experimented with crossing them with more common breeds. Experimentation was practiced in the Highlands and Lowlands alike; in areas well suited to fine-woolled breeds and in those less so. In the early nineteenth century at least, the introduction of Cheviots and other breeds was on an experimental basis in widespread pockets.

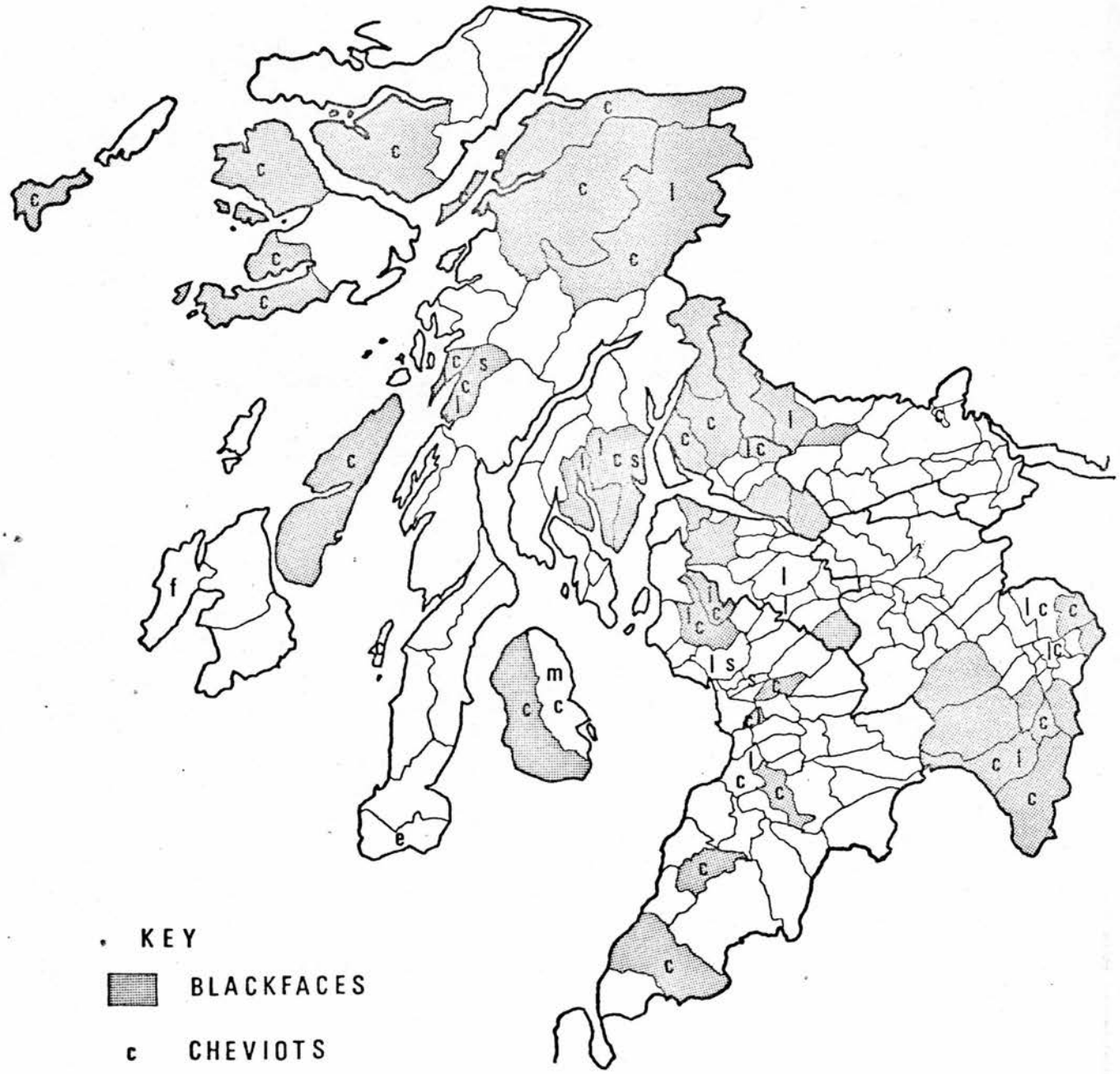
1830-1850 Black-face and Cheviot (see map 10:2)

By 1830 the White-face had been almost completely superceded, although small farmers in Kilchonan still kept them.[140] The Black-face was in turn experiencing increasing competition from other breeds, particularly the Cheviot. The lowland areas had little involvement in sheep farming. There were few in the Lanarkshire parishes of Blantyre, Dalserf, Dalziel and Pettinain, and in Renfrewshire they were of small importance.[141] In the carse of St. Ninians (and probably elsewhere too) the ground was considered too valuable for livestock although of course the moors carried sheep, and in Muiravonside the lack of fences strictly limited the number of sheep.[142] In Stair and Riccarton sheep were kept only round mansions for home use and in Roseneath there were few sheep.[143]

In those lowland areas where sheep were found it was the 'new'

MAP 10:2

SHEEP BREEDS - SOURCE N.S.A.



breeds which were paramount. In Crawford Cheviots had taken over the low ground because of the high price of wool, and Cheviot and Black-face had been crossed successfully while in Woodend and Beatlaws in Wandell parish there were some Cheviots too.[144] In Dunsyre Cheviot hogs were fattened on turnips although the bulk of the stock was Black-faced, and in Libberton the stock was of Cheviot-Leicester crosses.[145] Even in upland Carnwath and Crawfordjohn there were Leicesters and Cheviots on sheltered ground while the Black-faces were probably on the higher ground.[146] In Paisley there were a few Leicesters,perhaps for local use and in Neilston 50 of the 150 sheep were Leicesters.[147] In Drymen a few Leicesters were kept to supply wool for domestic use, and there were Cheviots in Logie.[148] In Kilmorie the Black-face, which had completely superceded the native breed , was in turn being crossed with the Cheviot which was found to be sufficiently hardy.[149] In Southend English sheep were reared for family use but Black-faces remained paramount.[150] In Ayr there were Leicesters and Cheviots, and Black-faces were kept only if there were winter turnips available.[151] Cheviot crosses were taking over from pure Black-faces in Coylton, and there were many cross-bred Cheviots in Dailly.[152] In Dalry, Symington and Kilbirnie, Cheviots and Leicesters were found on the low ground.[153] In Dreghorn there were even a few Southdowns, and in Kilwinning,Southdowns and Leicesters.[154] Turnip feeding was important in Kirkoswald (for the markets of Ayr and Glasgow) and St. Quivox, and this perhaps meant the use of a new breed.[155]

In moorland areas Black-faces retained their importance. Cheviots and merinos had been tried on the low ground of Kilbride, but Black-faces remained paramount on the hills.[156] They were paramount in Wandell, Wiston, Crawfordjohn, Lesmahagow, Dolphinton, Douglas and

Culter.[157] They were kept on the moors of Eaglesham and Kilmacolm, and were still the commonest breed in Stirlingshire.[158] This was probably because the low areas on which other breeds might have thrived were given over to arable. In Balfron and Drymen the Strathendrick Agricultural Club had improved the breed of sheep and cattle and in Buchanan too attempts had been made to improve the Black-face.[159] Cheviots had been tried but the climate was felt to be too exposed for them to succeed.[160] In Ayrshire too, the Black-face remained paramount. In Colmonell and Kilmarnock sheep were confined to the higher grounds and were mostly Black-faces, but there were a few Cheviots too.[161] Black-faces occupied the moors of Dalry, Symington and Kilbirnie, and there were some in Greenock;[162] perhaps they were fattening for the butcher. Certainly in Renfrew sheep belonging to Glasgow butchers were pastured on their way to market.[163]

Even in the Highlands the Cheviot had spread widely although Black-faces were important in most areas. There were some in Ardchattan and Gigha, and in Kilninian, where they were thriving.[164] In Kilfinichen they seem to have been the usual breed.[165] In Craignish there were both Cheviots and Leicesters as well as Black-faces, and Cheviots, Leicesters and Southdowns were found on "gentlemen's farms" in Dunoon, Kilmartin and Glenorchy.[166] On low ground in Inverchaolain, proprietors kept 100 Leicesters, and in Lismore and Appin a few Cheviots were owned by a Mr. Downie of Appin and Mr. Stewart of Bailechelish.[167] They were Cheviots in remote Tiree too, and in Jura, where Black-faces had only been introduced c1800 Cheviots were taking over.[168] In Morvern some Black-faces had been crossed with Cheviots.[169] Black-faces were still common on the hills of Luss and Rhu, but on the low ground there were a few Cheviots.[170] Similarly, in Kilmaronock Black-faces pastured the hills but there were some Cheviots and

Table 10:2

SHEEP

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854*	659830	197754	28359	63893	128495	18677	60962
1855	814029	245373	34544	61042	176619	25850	85513
1856	840729	259043	37649	61778	176989	24061	82546
1857	827113	239661	35013	58683	174746	22477	78647
1866	700621	262937	34318	53405	160014	26503	86392
1867	890131	338562	36638	71139	221267	34911	111746
1868	958984	346338	39335	73378	222643	32307	116277
1869	979102	335776	38530	72439	212068	33777	114491
1870	970297	354878	39515	75461	210109	34224	108055
1871	1022858	370466	41303	75406	219783	37597	112338
1872	1039627	379442	41999	76035	219078	40334	122024
1873	1063253	385094	40923	77322	218520	41401	125315
1874	1061873	375710	42050	78011	216757	39724	121536

Notes

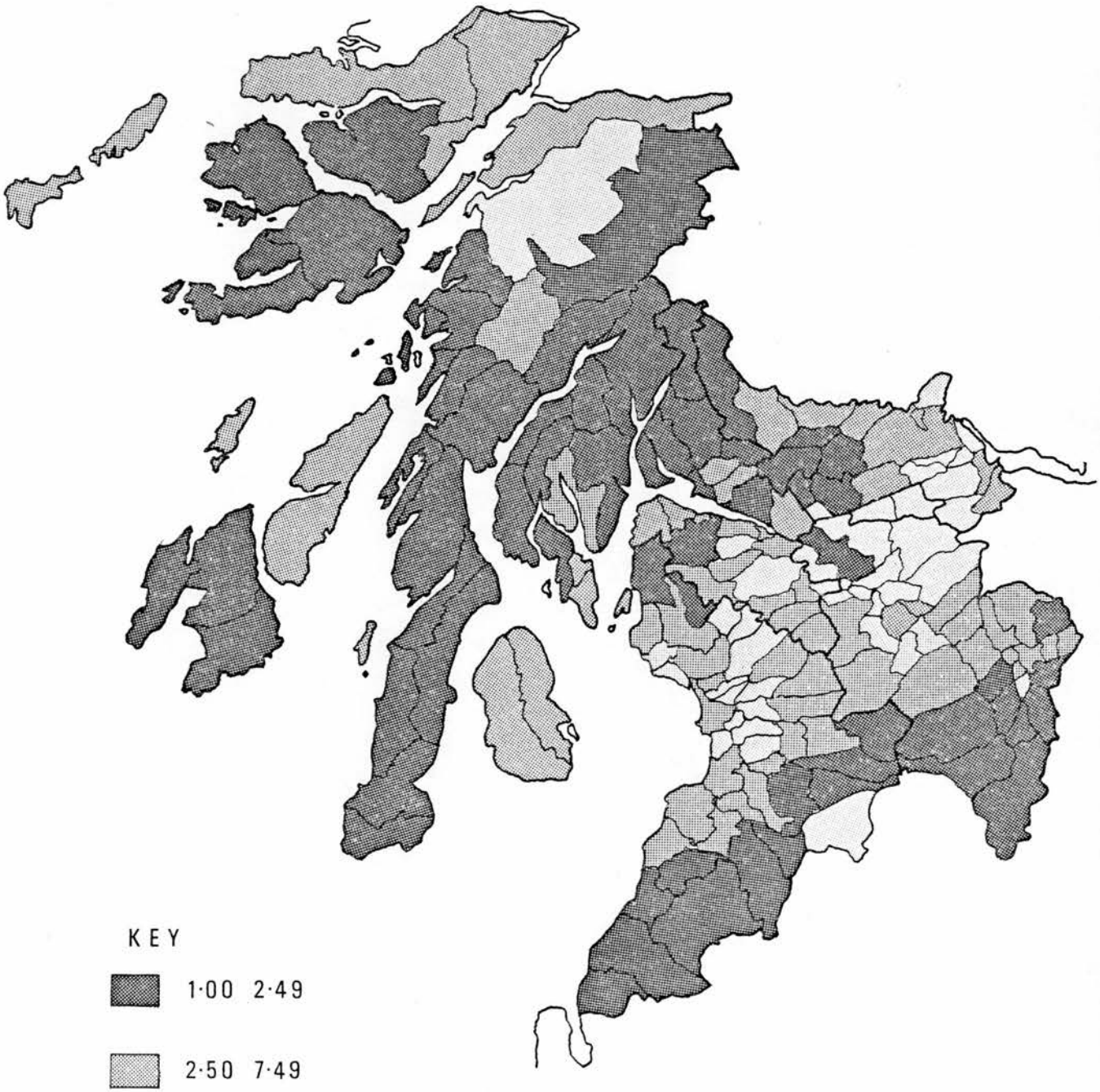
* 1. 1854 lambs omitted. N.B. increase in stock in 1855

2. 1855-7 breeding sheep, feeding sheep and lambs listed

3. 1866-74 sheep of 1 year old and more, and less than one year old listed

MAP 10:3

ACRES PER SHEEP 1870



Leicesters in low parkland.[171] In Arrochar and Old and New Kilpatrick Black-faces were the commonest breed.[172]

Summary

The process of competition which had begun with the introduction of commercial sheep farming had become more highly developed. The White-face had almost disappeared, and the Black-face was paramount only in upland areas. It was widely distributed in the Highlands and Lowlands,but there must have been other breeds as well in virtually every parish where sheep were kept. The chief among these was the Cheviot and it was given the best sheep grazings. In some parishes it had superceded the Black-face by the 1830s. The popularity of the Cheviot was great even in remote Highland parishes.

The most fertile land was devoted to arable farming, although there must have been many borderline areas which were temporary grazings. Indeed fine-woolled sheep probably grazed arable land when under the grass 'course'. Certainly the manure would have been as valuable to the arable as the rich grass to the pastoral element.

1850-1873 Enumeration (see table 10:2 and map 10:3)

From the 1850s the numbers of various categories of sheep were collected, but since the categories did not remain constant through time, they have been added to give total sheep numbers (see table). Throughout the period there were no readily-discernible trends, although in every case there was a marked increase in the 1874 figures over those of 1854. This was least strong in the case of Dunbartonshire and Argyllshire where the increase was 25% and 60% respectively, while in the other counties figures approximately doubled. This reflects the increasing importance of pastoral farming

at the expense of arable, and was probably least marked in those counties in which pastoral farming was already well established.

In 1854 lambs were omitted, so it is not surprising that there was an increase in stock in 1855 (which may have been a decrease in reality).[173] There was a net decrease in Dunbartonshire and this may have been because the gross decrease was a very large one, or may point to there having been fewer breeding farms. The overall increase of 1867 may be explained partly by the high prices of sheep in 1866, but the fact that the returns were taken in June as opposed to March in the previous year must have played a part.[174] High prices probably caused the increase in 1868 while the failure of turnips and other fodder crops due to disease in 1868 caused a decline in stock numbers in 1869.[175] In 1871 and 1872 sheep prices were again high, and this was also true of 1873, although bad spring weather did not favour sheep rearing.[176]

The lack of an overall pattern of change may have been due to the uneven spatial effects of crop failure and poor weather, and possibly points to differences in the nature of farming systems. Breeding, rearing and fattening farms and various breeds of sheep would respond differently to changing weather conditions and fluctuating prices, especially if these operated on a relatively small scale. For example, a fall in the price of wool coupled with a partial failure of the turnip crop might have resulted in a diminution in the number of Cheviots kept on lowland farms, but provided mutton prices remained steady a moorland Black-face economy need not have been affected. The evidence might also point to the regional nature of livestock markets but this is unlikely to have been the cause, for there was a considerable trade with Yorkshire and elsewhere, even at the beginning of the period. It is a pity that there

is no quantitative information relating to the breeds of sheep in various parishes. It would have been interesting to examine the patterns of such a distribution and to compare them with earlier dacades.

It is difficult to make a meaningful evaluation of the livestock census material. The changing categories in which sheep were enumerated render comparison meaningless, and crude numbers can be misleading. There is no information on the breeds of sheep counted and this had a bearing on the main purpose for which they were kept (meat or wool, upland or lowland) and consequently on their profitability. It is interesting to note, however, that in 1877, the 6,968,000 sheep in Scotland as a whole were said to be equally divided between Black-faces and Cheviots. It was stated that severe winters over the previous 20 years had caused a reaction in favour of the Black-face which until then had been slowly declining in favour of the Cheviot and other breeds.[177] There is no evidence of how these breeds were distributed on a county basis.

From the information which is available it is clear that the native breed was ousted by the hardy coarse-woolled Black-face as more areas became involved in large-scale commercial sheep rearing. This breed in turn experienced competition from the Cheviot, though it remained paramount on the bleak moorlands where it is frequently seen today. By the end of the period large numbers of sheep were kept in the study area and the fluctuations of the sheep population can only partly be explained in terms of changing weather conditions. It is likely that, towards the end of the period at least, foreign competition began to be felt in sheep farming as elsewhere. In 1826 the duties were removed from the import and export of wool, but it was towards the end of the century that imports rose dramatically.[178]

In mutton too the 181,000 cwts of boiled and tinned meat imported in 1882 was eclipsed by $3\frac{1}{2}$ million cwts of frozen carcases imported in 1899.[179] To the farmers of the early 1870s this was a problem still to be encountered, although they were already familiar with competition.

The distribution of sheep per acre in 1870 may be seen from map 10.3, and shows the predominance of upland areas in sheep keeping. The high concentration of sheep in the Glasgow area may relate to animals brought in for sale or for slaughter. The stocking of sheep in many parishes was very high by modern standards. In some cases there was a sheep for every 1.1 acres of land including that used by other livestock and under crops, buildings, gardens etc. This must have led to some heavy overgrazing. In the long term this may have contributed to the decrease in the sheep population.

AGRICULTURAL HORSES

In the era before motor transport, large numbers of horses were used in urban and rural areas for haulage and transport, and were widely used for farmwork. Horses pulled the plough and harrow, and hauled dung, peat and crops. Large numbers were also used by rural carriers. Most farmers who engaged in arable work possessed at least one horse, others had many more horses and some raised them for sale.[1] The management of horses varied throughout the period and over the study area. Sinclair felt that Scottish horses could not readily be divided into distinct breeds, because of the imprecise way in which they were bred.[2] As prices increased, however, more careful attention was being given to breeding.[3] The type of horse most commonly used for agriculture was the Clydesdale, so called because it was at Lanarkshire markets that the horses were usually sold, but the detailed origins of the breed were lost in history.[4] Lanark, Carnwath, Rutherglen and Glasgow were the chief fairs for horses, from where they were bought by dealers from Scotland and the North of England.[5]

In the 1790s the breed of horses was improving in many areas. In Ayrshire the native breed had been much improved by crossing with Clydesdales.[6] Some lightly-built animals were imported from Ireland and sold at lower prices.[7] In Kirkoswald too horses were imported from Ireland although it was felt that it might be beneficial to raise them locally.[8] Irish horses were imported to Kirkmichael, but high prices had induced some farmers to begin rearing their own.[9] They did so in many parishes. In Lismore and Appin breeding was practised but had greatly declined, and in Lochgoilhead horses from the west were reared and were found to be hardy and active.[10] In Dundonald attention had recently been given to the rearing of young

horses, and in Kilmaurs it had recently been practised.[11] In Carmunnock good Clydesdales were reared locally or bought at Rutherglen, and in Kippen most were reared locally.[12] In Kilbarchan some horses were reared locally but many came from the Lanarkshire markets.[13] In Killearn some farmers reared their own horses, although most purchased them from Glasgow and Rutherglen.[14] In the Lanarkshire parishes of East Monkland and Bothwell some young horses were reared, while in Lesmahagow the breed had much improved and in Culter the horses had recently increased in value.[15] Many draught horses were bred in Lanarkshire, those from the upper ward being thought best.[16] They were purchased by dealers from several parts of Britain. The Clydesdale breed was also paramount in Dunbartonshire, and horses used in Stirlingshire came from Ayrshire and Lanarkshire.[17]

In many parishes rearing was not practised, instead horses were bought at the fairs and markets. In Cambuslang horses were bought at Glasgow and Rutherglen but had been raised in Renfrewshire and Ayrshire.[18] Most horses in Luss were bought at markets, and those in Dalry were bought at 2-3 years old in Lanark, kept for one or two years then sold at double the price.[19] In Kilmaurs too, many horses were bought at four to five years old, used for one to two years then sold.[20] Similarly in Kilwinning horses were bought in Lanark at one year old, kept for four or five years then sold.[21] In Kingarth the quality of horses was improving and in Kilmorie they were imported at high prices from Argyllshire and elsewhere.[22] In Arran the decline in local breeding pointed to an improvement of the stock.[23] The horses imported from Argyll were larger than the native breed.[24] In other areas too breeding had declined as circumstances changed. In Hamilton there had been a decline in the number of horses needed as pasture had taken over from tillage in the recent past.[25] The

Table 10:3

HORSE TERMINOLOGY

Some terms used to refer to horses:-

MALES	Stone-horse; stallion	Male horse
	Gelding	Castrated horse
	Colt-foal	Young male taking milk
	Yearling colt, 2 or 3 year old colt	Young horse of certain age
	Horse	Four year old
FEMALES	Mare	Female horse
	Mare or filly foal	Young female taking milk
	Yearling filly, 2 or 3 year old filly	Young female of certain age

from Sinclair J. (1814) op.cit.
Vol III p.174

hills of Kilfinichen had been occupied by breeding mares, but sheep had taken over.[26] Similarly in Kilmalie many horses had been reared before the introduction of sheep farming.[27] In Eaglesham, however, rearing was still practised on the moors.[28]

In many areas the breed of horses had not reached a high level of improvement and there was great variation in the type of animals kept. In Tiree horse numbers had been reduced on the Duke of Argyll's orders, yet still many of them were starving.[29] In Kilchonan too, there were said to be too many horses, but they sold at high prices in Ireland.[30] Iona horses were like Shetland ponies, and those of Jura were perhaps similar; they were said to be small and hardy.[31] In Kilfinan there were both Highland and Low-country horses, and those of Kilmore were reputed to be stronger than horses from the North Highlands.[32] Horses at Lochwinnoch and Old Kilpatrick were very good, and those of Cardross and West Kilbride had improved.[33] In Craigie more attention was being given to improving horses and cows because of the higher price which they fetched.[34] In Sorn most horses were of the improved type, although there were still some small ones of the old breed.[35] In Stair artificial grasses had facilitated better feeding and an improvement in the breed of horses.[36] In Largs most farm horses were hired in winter and spring to neighbouring areas, and were returned in poor condition to perform the farm work.[37] Clearly this was a bad system. In Symington horses were similarly hired out in winter and spring.[38]

The number of horses used in farm work was also changing at this time. In about 1750-60 in Stirlingshire it had been customary to use four two-year-old horses for the plough, but this had been superceded by the better method of using two older horses.[39] In East Monkland and Kilbarchan the modern method of using two or three

horses to the plough was increasing in popularity, and in Kilmalie gentlemen had begun to use two horses, although the tenants still used four.[40] In Campsie in 1793 there were 222 horses which drew 70 ploughs; 20 ploughs drawn by 4 horses each, 26 drawn by 3 horses, and 24 two-horse ploughs.[41] In Kilchonan the four-horse team was still most common, as it was in Eaglesham where the horses were yoked in pairs.[42] Draught horses in Govan were larger than average and only two were needed for the plough.[43] In Kilsyth the use of Small's two-horse plough and a diminution of the area of high ground which was ploughed had caused a great reduction in the number of plough horses.[44]

By the second decade of the nineteenth century, patterns which had begun earlier continued to develop. In Buteshire most horses were imported from Argyllshire.[45] On the island of Bute some had come from Ayrshire, but in Arran the horses originated in Kintyre.[46] In the higher parts of Argyllshire however, horse-rearing had been neglected since the introduction of sheep-farming.[47] In Dunbartonshire too only small numbers of horses were bred, although breeding had been common in the past.[48] The horses which were bred were Clydesdales. Young animals were used for farm work especially on heavy soils.[49] They were bought at two to three and sold at five to six years old. On farms close to markets older horses (aged five to fifteen) were used to drive hay, potatoes etc. to market and to cart manure.[50] Often more horses were kept than was strictly necessary, although more horses were needed on heavy than on light soils.[51] In Renfrewshire and Stirlingshire few horses were bred, but great attention was paid to the animals, which came from Lanarkshire and Ayrshire, and they had been improving in size and weight.[52] In Ayrshire itself a variety of breeds of horses was found.[53] The native Galloway had

been much improved by crossing, and there were many fine animals kept in good condition by careful attention and feeding.[54] The number of horses had, however, diminished for it was estimated that, when improved rotations of white and green crops were in use, two or three horses were adequate where four had been used before.[55]

In the 1830s in numerous parishes there had been great improvements in the horses kept. In Renfrew there were pure or cross-bred Clydesdales, and in Paisley and Kilbarchan fine-quality Clydesdales were found in good condition.[56] Clydesdales were also found in Erskine, Inchinnan and Old Kilpatrick, but few were reared locally.[57] In Kirkintilloch small Clydesdales were found, while in Cardross, Kilmorie and Inverchoalain the small indigenous horses had been improved by crossing with Clydesdales.[58] In Cardross and in Cumbernauld livestock improvement had been fostered by agricultural societies.[59] In Shotts too, the agricultural society helped to maintain standards and many excellent Clydesdales were reared.[60] In Drymen the Strath Endrick Agricultural Club had been responsible for improving the stock.[61] Like Shotts, some parishes concentrated on rearing, but farmers seem to have relied increasingly on buying their horses at markets.[62] In Avondale extensive horse-rearing was practised, and also on a smaller scale in Bothkennar.[63] In Eaglesham horses were bought at Glasgow in spring and many were sold when the farm work was finished.[64] The Glasgow and Rutherglen markets provided horses for farmers in Cambuslang, and those in Dalziel had found it cheaper to buy horses at these markets than to rear them themselves.[65] In Ardchattan the breed of horses was improving, and in Craignish larger animals were being used.[66] This may point to a greater reliance on outside markets. Horses in Crawfordjohn and Carmunnock were in particularly good condition, although in all cases in the former parish this is not easy to believe.[67]

A few of the tenants used their horses to drive coal to Moffat, Leadhills and Wanlockhead as well as to perform the work of the farm.[68] The nearest source of coal is likely to have been the Douglas area, and its carriage through such difficult country would probably have imposed considerable strain on the horses. In some parishes the improved breed of horses had still not been introduced. In Jura the horses were small and hardy, and in Ardnamurchan there were still many ponies as these were cheaper to keep than horses.[69] In Dunoon larger horses had recently superceded the Highland ponies.[70] In Glassary the horses were not very good, but it is not certain whether they were the large or the small type.[71] In Girvan half the agricultural horses were of the smaller Irish type.[72] By the 1860s the breeding of horses in Lanarkshire had declined as a result of the introduction of turnips and the discontinuation of using four horses for ploughing.[73]

Horses were enumerated in the census of 1854-7, although the categories changed during that time, and they were not dealt with by the June Returns until 1870 (see table 10:4 and map 10:4).[74] It is therefore difficult to find trends in the data. In all the years except 1873 and 4 there is no overall pattern of change. In all counties there was a substantial fall in numbers from 1855 to 1874, and this may reflect a decline in the importance of arable farming and/or increasing agricultural efficiency.

Throughout the period of study the keeping of horses was widespread. As well as the agricultural horses which are considered here, large numbers were kept for riding and haulage in towns and country areas. With regard to the animals kept for agriculture, there was a growing awareness of the need for good quality, and careful attention was given to breeding or to purchasing suitable animals from reputable markets. In particular the handsome Clydesdale increased in importance,

MAP 10:4

ACRES PER HORSE 1870

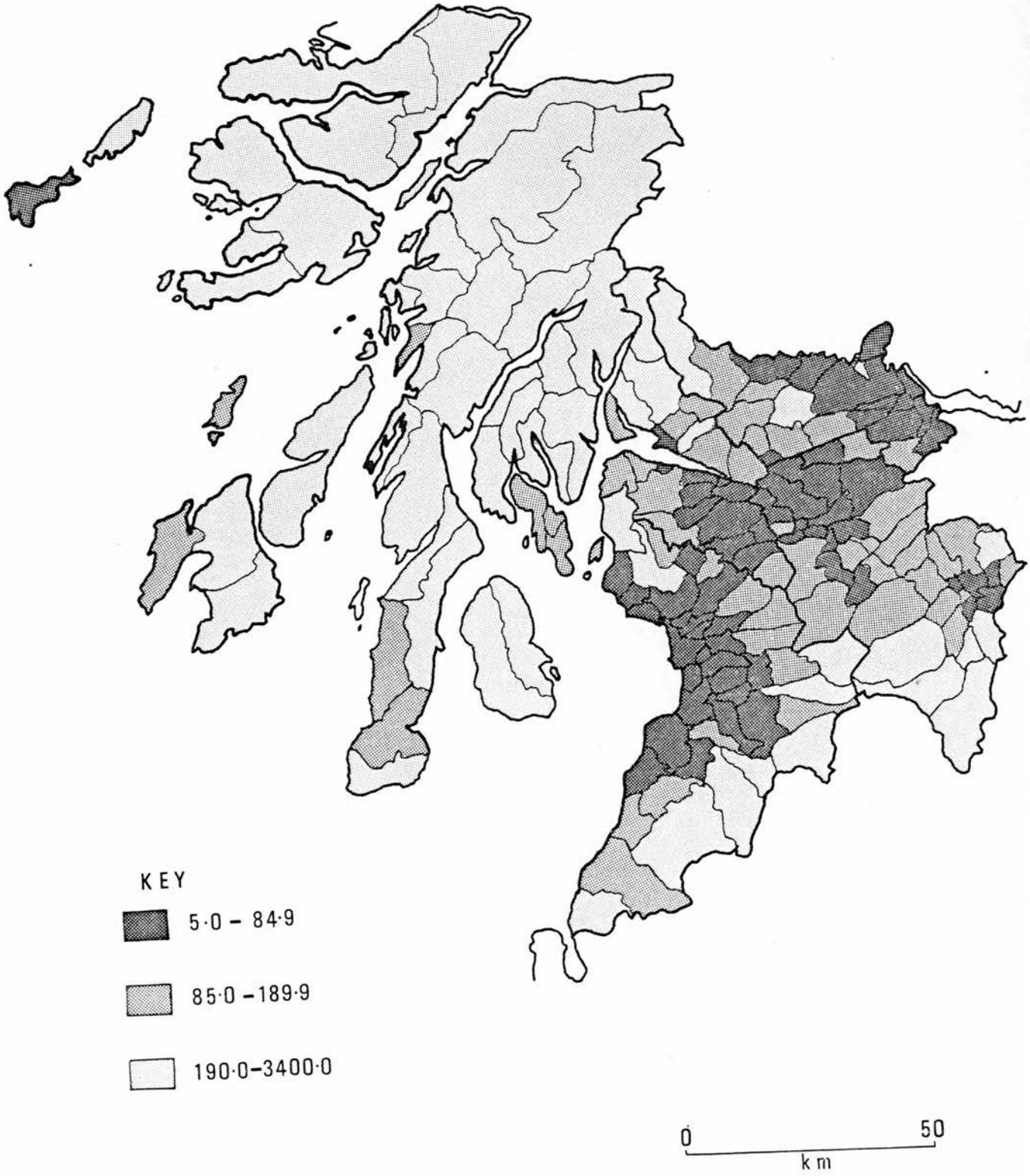


Table 10:4

AGRICULTURAL HORSES

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	5500	8494	899	1813	7241	3084	4588
1855	5619	8616	961	1867	7040	3016	4631
1856	5663	8927	982	1853	7271	2956	4786
1857	5588	8951	1013	1826	7203	3131	4714
1866							
1867							
1868							
1869							
1870	4001	5910	646	1130	5263	2133	3087
1871	3984	5859	673	1170	5386	2208	3179
1872	3926	5769	704	1153	5400	2170	3071
1873	3735	5665	679	1084	5263	2051	3010
1874	3847	5755	696	1130	5333	2081	3054

N.B. 1. 1855-7 Agricultural horses listed of 3 years and more, and less than 3 years old.

2. 1854 'Horses'.

3. 1870 Agricultural horses.

and farmers became more aware of the need for good management of their horses. By the 1830s it was only in the more remote areas that a poor stock of horses was to be found, and it is likely that improvements were made gradually here as elsewhere. Agricultural societies played their part in this as in other branches of agricultural improvement, and they fostered a spirit of competition by organising ploughing matches. The statistical data of the 1850s onwards provide no information on the breeds or condition of horses, and it is likely that horse numbers fluctuated in response to the changing fortunes of arable farming. In 1870 we find agricultural horses widely distributed throughout the area, and much as one would expect they were most important in the arable areas (see map 10:4).

PIGS

The pig is an extremely useful animal. It is omnivorous, and almost every part of it can be utilized. Pigs have been kept since Neolithic times, although in the Jewish religion the consumption of their flesh was forbidden.[1] Although this taboo was removed in the early Christian church, Old Testament teaching strongly influenced the Scottish church during and after the Reformation, and this is one reason that pigs were felt to have been unpopular in Scotland especially in the Highlands.[2] Another explanation is that an open-field, almost treeless landscape, such as occurred over most of Lowland Scotland in the seventeenth and eighteenth centuries, there was no place for swine.[3] The alternative, intensive rearing, was not favoured because of the damage which the animals caused and their potential danger; they had occasionally been known to eat infants.[4]

Nevertheless, the dislike of pigs had begun to decline by the late eighteenth century probably in the wake of enclosure. In Lanarkshire in 1798 few pigs were kept and their flesh was not popular, although some country gentlemen kept them for their own use, and some to eat dairy waste.[5] This may have been the purpose of the 41 kept in Cadder and the seven in Symington.[6] In Lesmahagow the old superstitions had been overcome, and pigs were maintained on dairy offal then fattened on potatoes in autumn; 70-80 were killed annually.[7] In East Kilbride and Avondale swine were fed on whey and then fattened on beans, potatoes or oatmeal and they sold well in Glasgow.[8] Their profitability was recognised in Lanark, but few pigs were kept.[9] In Aryshire pigs were rising in status and some farmers kept a few for their own needs, but only gentlemen or distilleries raised them in large numbers.[10] However, they were not mentioned at all in the O.S.A.

Table 10:5

*PIG TERMINOLOGY

Some terms used to refer to pigs:-

Boar	Male pig
Sow	Female pig
Shott	Pig which has been weaned
Pig	Young while receiving milk
Swine	Most common generic term for species

from Sinclair J. (1814) op.cit.
Vol III p.215

* N.B. The common modern term pig will be used in this thesis to refer to the species, although in the early nineteenth century this had a particular meaning, and swine was the more common collective noun.

for the county. In Stirlingshire too, some gentlemen kept pigs and they were fattened at distilleries where they were fed for six to eight weeks on boiled potatoes, bran and corn mill refuse, then for two to three weeks on oats and peas.[11] There were a few swine in Kilsyth, probably in association with dairying.[12] The ordinary farmers did not consider them to be valuable. Swine were taken to Kilfinnan in summer and harvest and fattened until winter, then slaughtered, and there were many in Islay.[13] There were many swine in Gigha and Cara, but they were falling into disfavour because they were inadequately enclosed, and the harm which they did to pasture was not out-weighed by their value.[14] In Ardchattan the prejudice against swine's flesh was declining and pigs were reared by most farmers.[15] Only a few people had pigs in Kilmore and these were of poor quality.[16] In Renfrewshire they were mentioned only in Lochwinnoch where there were 42 swine.[17] There were few or none in Kilbarchan, and in Dunbartonshire and Buteshire they were not mentioned at all.[18]

By about 1812 the old prejudices seem to have been further eroded. A few pigs were bred throughout Argyllshire especially in Kintyre; even the poorest families could fatten them on potato peelings, and they did well on whey, buttermilk and still refuse.[19] In Ayrshire most farmers kept a few pigs for family use and many fattened them on whey for sale in Ayr and Glasgow.[20] Nevertheless, Henry Richmond of East Montgarswood, Sorn, kept no pigs even though he had turned his attention to dairying and produced mostly cheese.[21] In Dunbartonshire too, pigs were kept on nearly every farm, usually for home consumption.[22] Little attention was given to their management; nevertheless, they thrived on garden refuse, potatoes, cut grass and meal.[23] In Stirlingshire too, pig-keeping was spreading and almost

every family kept them for their own use.[24] The animals were fattened on vegetables, cut clover, whey and buttermilk and when ready for the butcher they were given oats and beans to make their flesh firm.[25] The fattening of pigs at distilleries had ended at prohibition. The prejudice against swine had also declined in Renfrewshire, but they were not general and their spread was slow.[26] In Buteshire the old prejudice continued, and although not unknown they were rarely kept.[27]

In the 1830s evidence of pig farming is scanty, but suggests that it was a common accompanyment of dairying and was a profitable means of using waste. Many swine were reared in Neilston, and in Lesmahagow they were kept both by farmers to consume dairy waste, and by labourers to provide dung for potatoes and food for the family.[28] In Douglas too, they were reared for home consumption and there were about 250 of them in the parish.[29] In Dalserf there were about 450 pigs, in Bothwell about 600 and in Blantyre about 250.[30] In Ayrshire there was a close link between pig-rearing and dairying. In Craigie, Dunlop and Dalry, swine were maintained on whey and in Colmonell there were 300 of them.[31] In Dalry it was reckoned that each pig could consume the refuse of three cows and this is bourne out by their being 258 pigs and 910 milk cows in Dunlop, 134 swine and 536 milk cows in Kilbirnie, and 218 swine and 600 dairy cows in West Kilbride.[32] Swine were common in Girvan even in the town.[33] In Largs they were general, they were numerous in Kilmarnock, Stewarton and Ochiltree and were found in Stevenston.[34] In Symington most cottagers kept pigs.[35] Both poor and rich tenants in Inverary reared pigs, and the prejudice against them seems to have continued only among old people.[36] In Tiree pigs were numerous and about 500 of them were exported annually to Glasgow and Greenock.[37] In Stirlingshire pigs were not mentioned at all, and their only mention in Buteshire was in Kilbride where 630

were produced annually.[38]

In 1866 in Ayrshire pigs were found on every farm where cheese was made.[39] Many pigs were bred in Dumfriesshire and Ayrshire farmers imported large numbers from Carlisle and Dumfries.[40] They were fed on whey and vegetable refuse, then on fattening mash for the last 8-10 weeks of their lives. It was reckoned that 6-8 pigs could be kept for each 20 milk cows (this ties in with figures for the 1830s) and they were carefully supervised and cared for.[41] In Lanarkshire too pigs were important especially on dairy farms.[42] The Caledonian Railway had opened up the southern markets, and as a result pork had increased in value.[43] Considerable numbers of pigs were kept in the whole area in the 1850s (see table 10:6), but the numbers fell from 1854-1856, and rose in 1857.[44] They had increased substantially by 1866.[45] After this, trends were not uniform, but did co-incide for 1868 and for 1870 and 1872.[46] Numbers had declined in all counties by 1874, and in Dunbartonshire the total was only c64%, and in Stirlingshire c67% of that of 1854.[47]

Despite the association between pig farmers and dairying, there seems to be little correspondance between trends in total stock numbers. Dairy cattle increased in number over the period while pigs declined (see tables 9:3 and 10:6). This may have been related to a change in emphasis from cheese production (pigs were fed on whey) to other dairy enterprises, or may have been brought about by problems of pig-rearing, disease or falling market demand for pork products. The distribution of pigs in 1870 may be seen from map 10:5 which shows the number of acres per pig in each parish. The largest concentration of pigs was found in the lowlands, particularly in Ayrshire. A link with dairy farming can be seen here, and a close correlation between pig and milk cow population density can

be observed (see map 9:3), particularly in the cheese belt (pigs were often fed on whey). In the upland areas, especially in Argyllshire where there had been an aversion to pigs, the concentration of this animal was low.

Pigs and sheep were high in price in 1866, and in 1868 the fall in numbers was due to the dearness of corn and to disease.[48] The decrease in 1873 was due to high prices of grain and potatoes, and to pig disease as well as to the increasing popularity of red meat with the labouring classes.[49] From 1870 increasingly large quantities of Australian preserved meat were imported to the United Kingdom, and may have contributed to the fall in the pig population.[50] It is clear, however, that during the period of study the prejudice against pigs which had developed in the unenclosed agricultural landscape, or possibly as a result of religious taboos, was completely eroded. By the mid-nineteenth century pigs had assumed an important role in all counties. This is easily understood as they are economical and versatile producers of meat.

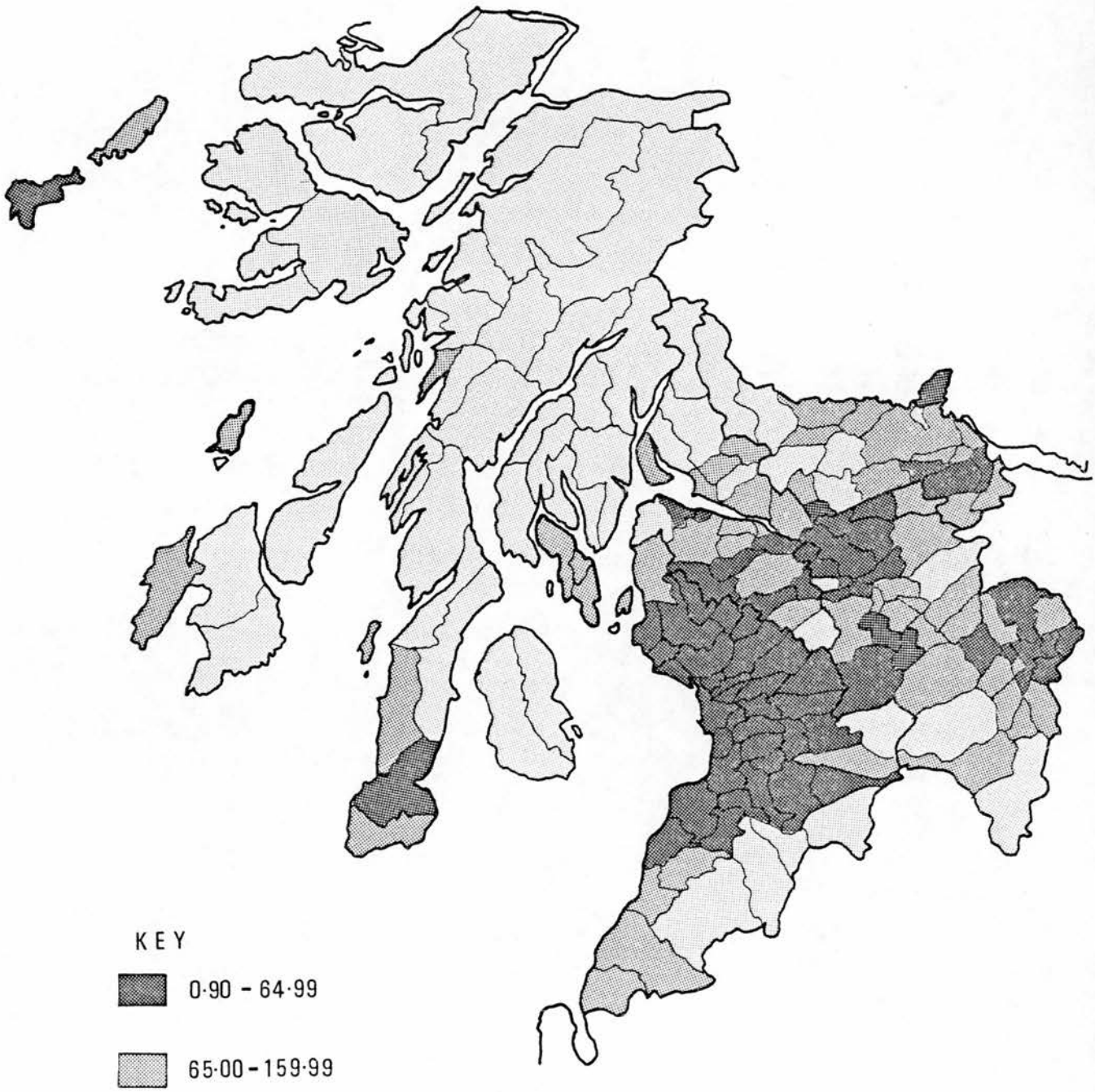
Table 10:6

PIGS

	Argyll	Ayr	Bute	Dunbarton	Lanark	Renfrew	Stirling
1854	5559	15526	933	1274	8891	2481	3254
1855	3458	12483	786	1042	7666	1808	2488
1856	2834	11442	664	844	6998	1446	2348
1857	3230	12303	726	939	8006	1761	2710
1866	5702	13502	1250	1196	8992	2354	3673
1867	5085	14603	1137	1202	10008	2347	3021
1868	4017	11417	655	687	6947	1583	1791
1869	4081	11739	694	781	6801	1813	1694
1870	5080	15574	859	1176	8679	2571	2498
1871	6265	18488	2455	1436	12284	2911	3193
1872	5939	17326	926	1109	10563	2359	2846
1873	4493	14856	675	972	8199	1873	2076
1874	4219	14600	613	821	7382	1888	2196

MAP 10:5

ACRES PER PIG 1870



Chapter 11

CONCLUSION

This thesis has explored some themes concerning agricultural change in the West of Scotland over an eighty year period. It has drawn upon various sources each of which has its own limitations. Geographical contrasts in farming practice have been found within the study area, as well as changes through time. In general terms, it was those areas closest to the growing industrial centres which first adopted improved farming practices, and which benefitted from the market-potential which these areas provided. Much was learned by copying others, and by following the example set by improving farmers. Both proprietors and tenants were involved in innovation, and gradually during the period of study, even peripheral areas were abandoning outdated practices in favour of better ones. As one would expect, general economic expansion stimulated change in the agrarian sector which in turn helped to support a largely non-agricultural population.

Although at the start of the period many traditional practices continued without question, self-interest was already teaching farmers to seek improved ways of doing things. It would, however, be wrong for us to think that even at the start of the eighteenth century Scottish farmers worked on a uniform primitive system waiting for the dawn of knowledge. The work of Dodgeshon and Whyte has shown the

complexity and rational nature of early modern Scottish agriculture, and one suspects that as more evidence comes to light, agricultural patterns will be seen as far more complicated than writers of general texts have led us to believe. The infield-outfield system was substantially modified to suit individual circumstances and preference, and more modern farming systems were carefully tailored to suit particular needs. Practices were not necessarily uniform even on the same farm, but rather changed in response to circumstances and in the light of experience. While recognising small-scale variations, these must not be allowed to obscure broad themes and trends.

As this thesis is a pioneer one it does not attempt to be comprehensive. It became clear at an early stage that artificial boundaries must be drawn round any topic to be studied. In reality one sector of the economy cannot adequately be understood in isolation, and without its attendant social effects and causes. For practical purposes, however, it is necessary to subdivide subject areas into workable portions. This study has explored some of the themes of agrarian practice, and has exposed others which could form the subject of future work. It is clear that some avenues might prove interesting while others are unlikely to do so. Some of the strengths and weaknesses of source material have emerged, and from this it is possible to assess whether the exploration of certain themes would be feasible. It is hoped that some interesting ideas have emerged from this work, and that future study will permit the expansion, consolidation or possibly the rejection of these ideas. It must be remembered, however, that a pioneer work such as this will necessarily be subject to much modification as themes are explored in greater depth and over a wider area.

The limitations of this work are numerous. It covers only a

small aspect of agriculture, and does not deal exhaustively with this. There are gaps of several years within the time period, and the nature of information provided by the sources changes over time, so that it is not readily comparable. In addition, information is lacking for parts of the area in certain subjects or for certain years. This means that the picture which emerges is not a comprehensive one or even a coherent one. It would be convenient if a farm by farm or parish by parish summary were available showing crops grown and breeds of livestock kept, over a number of years, so that a detailed analysis of farming patterns could be made. Unfortunately the sources do not provide such information, and one must rely on the inadequate data which are available.

As well as the limitations regarding information relating to crop and livestock patterns, the thesis fails to deal with topics which are central to agriculture. Such aspects as drainage, rent levels, farm structure, land ownership, mechanisation, trade, wages and prices are barely touched upon. In some cases this was because the sources did not provide sufficient information for a meaningful study, but for the most part it was due to the need to limit the topic to a manageable and coherent whole. For a similar reason it is limited in areal coverage.

At least some of the limitations of this study have been the result of inadequacies in the source material. A major problem was the highly subjective and disorganised nature of much of the information, as was the difficulty of comparing one source with another. If one begins to question the accuracy of much of the data, the conclusions of the research must be even more tentative. It is likely that in the future, private estate muniments will yield much more information, and play a larger part in historical research. As more

estate collections find their way into public archives, and existing collections are classified, there will be an increase in the information available for this kind of research. In addition, it is likely that as the more readily available source material is worked upon, more obscure sources will be discovered.

It has been explained that this study is a pioneer one, and its limitations have been touched upon. Perhaps its main value is the basis which it will give for future research both by the author and by others. Some suggestions will, therefore, now be made of the ways in which research might develop, and of methods by which the sources might be better used. It would be interesting to extend the scope of this study both in time and in space. The study area has been influenced chiefly by the Glasgow conurbation, but to what extend did other cities exert an influence on their surrounding area? How far did this extend and in relation to which commodities? Was it similar to the Glasgow case? At what period did agricultural "improvements" begin? Can one really speak of an agrarian revolution, and if so when did it take place? Where did improvement begin and who was responsible for it? At a more detailed level it would be possible to expand on each of the chapters of the thesis. A more comprehensive study of the length of lease would perhaps bring out a stronger contrast between upland and lowland areas, and might show a special pattern in the Highlands and Islands. Contrasts over time might emerge by extending the period of study. A more comprehensive and systematic study of cropping restrictions might bring out clearer spatial changes, and a comparison of leases and rentals should indicate the survival-rate of the former. Rentals themselves could be used to guage the survival of multiple tenant farms, or of services, and to calculate land values. Court records might yield information

on lease breaking, and on the conflicting interests of landlord and tenant.

In respect of crops, the June Returns could be used to construct a yearly synopsis of patterns in each parish. Contrasts could be linked to prices as well as to changing political, economic and weather conditions. By expanding the study spatially, greater contrasts might be observed and crop regions identified. Changes in the growth of particular crops could also be linked to changes in diet and in social conditions. Did the increase in popularity of white bread affect the growth of wheat and oats? Did changes in the distilling and brewing industries affect the growth of barley? What influence did the decline of horse power have on the oat acreage? As living standards improved did the importance of the potato alter?

Much detailed work also remains to be done on rotations. More data are needed over a longer time scale to test the validity of the model of the development of rotations. More information is also needed on the extent to which rotations were followed through, and on the value of artificial manures in giving farmers a greater choice in the crops which they grew. A more detailed study of livestock farming would be useful, particularly in relation to improved conditions and the distribution of various breeds of stock. In particular the dairying model requires further testing in relation to other cities, and in the extent to which particular operations gained prominence in response to price levels and transport facilities.

As well as a direct extension of the topics covered in this thesis, much research is needed on different aspects of agriculture in this period. Land ownership is an important theme , as are the spread of drainage and the use of machinery. Tracing the spread of innovation is another theme of geographical interest. More peripherally

the provision of capital, movement of population, re-organization of social structures and development of industry all have a bearing on agriculture.

Although the source material limits the exploration of some of these topics, much could be done to improve the value of the sources to the research worker. If it is to be used on a fairly large scale, the computerisation of the census material can greatly increase its value. It has already been mentioned that the classification and increasing collection of private estate muniments will be useful. It is also hoped that a growing awareness of the value of estate papers will make more accessible those which are in private hands. Perhaps the source which has most unrealised potential is the Old and New Statistical Accounts. This source covers a wide variety of topics for the whole of Scotland and records changes over an important 30-40 year period. Nearly all research workers dip into these accounts, and Morgan has based a thesis entirely on the O.S.A. It would seem, however, that this source is very laborious to use, and it is probably undervalued because of this. It would save a great deal of time if the data were put on computer, and classified under a large number of categories so that they could be readily extracted for any topic. The setting up of such a data bank would be a large exercise requiring substantial funding, but would permit full use to be made of this valuable but difficult source. Research workers would save time which could be spent on more diverse source material. In years to come it may be that money will be available for the much wider use of computerised storage of all archive material. This would make easier the task of data collection, and would free scholars to spend more time and effort on interpretation of material.

Nevertheless, the historical geographer will always have to cope

with the problems of inadequate and unsuitable data, as well as with learning the thought processes of a bygone age. In contrast, geographers studying present day conditions can collect data as and when necessary, and are familiar with the circumstances of their collection. As well as being interesting for their own sake, historical studies can provide a useful insight into many of the conditions and institutions which exist today. It may also be that, with the rapid decline of fossil fuels, the increase in unemployment and the growing awareness of the harmful nature of some chemicals, society will wish to re-examine some of the methods and ideas of a by-gone age.

APPENDIX 1

N O T E S

CHAPTER 1

1. Jones E.L. (1967) 'Agriculture and economic growth 1650-1750' in Jones E.L. (ed) (1967) Agriculture and Economic Growth in England 1650-1815 pp. 152-71.
   Rostow W.W. (1960) The Stages of Economic Growth.
2. E.g.Flynn M.W. (1963) Origins of the Industrial Revolution.
   Rostow W.W. (1960) op.cit.
3. E.g.Mathias P. (1969) The First Industrial Nation.
   Chambers J.D. (1961) The Workshop of the World.
4. Laxton P. 'Social and economic change 1750-1850 : some strategies and questions for geographers'. Paper presented at the Institute of British Geographers Annual Conference, Newcastle, January 1977.
5. Agriculture was seen as the basis of the wealth of a country. O.S.A. XI (1794) p.203.
6. "The years 1850 to 1873 were years of unparalleled success for the British economy, industrial and agricultural alike." Williams H.T. (1960) Principles for British Agricultural Policy pp.3-4.
   "From about 1873 depression hit both industry and agriculture and continued for the next two decades. Britain's industrial supremacy was beginning to be challenged." Ibid.p.5.
7. "The period just beyond living memory is notoriously difficult for the scholar: objective truth and uncertain hearsay recollection are confused and intertwined: documentary material is abundant but it is uneven in quality." Perry P.J. (1974) British Farming in the Great Depression 1870-1914 p.13.
8. E.g. Prothero R. (First Lord Ernle) (6th Edn 1961) English Farming, Past and Present.
   Chambers J.D. & Mingay G.E. (1966) The Agricultural Revolution.
   Kerridge E. (1967) The Agricultural Revolution.
   Gray M. (1957) The Highland Economy 1750-1850.
   Orwin C.S. & Weatham E. (1964) A History of British Agriculture, 1846-1914.
   Jones E.L. (1967) op.cit.
9. E.g. Perry P.J. (1974) op.cit.
10. E.g. Symon J.A. (1959) Scottish Farming, Past and Present.
    Franklin T.B. (1952) A History of Scottish Farming.
    Slaven A. (1975) The Development of The West of Scotland, 1750-1960.
    Millman R. (1975) The Making of The Scottish Landscape.

11. E.g. Baker A.R.H. & Butlin R.A. (1974) Studies of Field Systems in the British Isles.

12. E.g. Dodgshon R.A. (1969) 'Agricultural change in Roxburghshire and Berwickshire 1700-1815' Unpub. Ph.D. thesis, Univ. of Liverpool.
Whyte I.D. (1974) 'Agrarian change in Lowland Scotland in the seventeenth century' Unpub. Ph.D. thesis, Univ. of Edinburgh.

13. E.g. Morgan V. (1969) 'The First Statistical Account as a basis for studying the agrarian geography of late eighteenth century Scotland' Unpub. Ph.D. thesis, Univ. of Cambridge.
Gray M. (1957) op.cit.
Gailey R.A. (1960) 'Settlement and population in Kintyre 1750-1800' S.G.M. 76 pp.99-107; (1961) 'The mobility of tenants on a Highland estate in the early nineteenth century' S.H.R. 40 pp.136-154.
Turnock D. (1967) 'The evolution of farming patterns in Lochaber' T.I.B.G. 40 pp.145-158; (1969) 'North Morar: the Improving Movement on a West Highland estate' S.G.M. 85 pp.17-30.

14. E.g. Smout T.C. (1969) A History of the Scottish People 1560-1830.

15. E.g. Morgan V. (1969) op.cit.

16. The Clyde area contained only 9.7% of Scotland's population in 1755, but this increased to 15.3% in 1801 and 25.5% in 1851. These figures contrast with 10.8%, 10.6% and 11.3% respectively for the Lothians.
Osborne R.H. (1958) 'The movements of people in Scotland 1851-1951' Scottish Studies II pp.1-46.

17. E.g. Board of Agriculture county reports, agricultural census and Statistical Account material at the parish level.

18. E.g. agricultural statistics were not collected on a regular basis until 1866.

19. E.g. Highland and Agricultural Society, Society for the Propagation of Useful Knowledge.

20. E.g. Caird J. (1849) High Farming Vindicated and Further Illustrated.
Campbell A. (1811) A Journey from Edinburgh through Parts of North Britain.

21. "Knowledge of every kind is universally diffused and there is scarcely a family that does not regularly read the newspapers." O.S.A. Old Monkland VII (1793) p.337.
"The farmers are uncommonly intelligent. They have formed themselves into a society which meets every month. Their object is to communicate their knowledge, and purchase the most proper books relating to their business." O.S.A. VII (1793) p.378.
"All can read and most can write." Bill to Amend the Law with Respect to Agricultural Servants (1860) I p.130. Parliamentary Papers 1860 (171) 169.

21. (contd)
"The Scotch would deprive themselves of the necessities of life to give their children education." Report on Women and Children in Agriculture (1868) p.546. Parliamentary Papers 1867-68 (4068) XVII I 237.
"Near-universal literacy, which it had long been possible to take for granted in Scotland, was attained in Britain as a whole in the last decades of the century."
Perry P.J. (1974) op.cit. p.16.

22. E.g. Fiars prices were not struck uniformly: the agricultural data taken from smallholdings in 1854 were assumed to be applicable to 1857.

23. "Statistic or statistical may either imply enquiries connected with the state of a country or respecting matters of state." Communications to the Board of Agriculture Vol.1 (1797) p.xxxv.
Cleland J.C. defined statistics as "the knowledge of the present state of a country with a view to its future improvement." Enumeration of the Inhabitants of Glasgow (1832) p.1.

24. The Advantages which have resulted from the Establishment of the Board of Agriculture (1809) p.46.

25. Of all the schemes postulated, "that of ascertaining the agricultural state of the country, and the means of its improvement, was unquestionably the most important." Ibid. p.45.

26. "Each person who shall undertake them shall have a district that may be gone over in five or six weeks." Communications ... Board of Agriculture (1797) op.cit. p.lviii.
The reports were essentially rough manuscripts given out for correction. Advantages ... Board of Agriculture (1809) op.cit. p.41.

27. Ibid. p.42.

28. Ibid. p.41.

29. Whyte A. & Macfarlan D. (1811) A General View of the Agriculture of the County of Dunbarton p.iii.

30. Advantages ... Board of Agriculture (1809) op.cit. p.46.

31. Sinclair saw them as a pyramid of statistical enquiry. Sinclair J. (1814) General Report of the Agricultural State and Political Circumstances of Scotland Vol.III Addenda p.12.

32. Sinclair J. (1814) op.cit. III Addenda pp.12-13, although Geddes A. (1959) says 938 in 'Scotland's Statistical Accounts of Parish, County and Nation c1790-1825 and 1835-1845' Scottish Studies III p.17.

33. N.S.A. Dunipace VIII (1845) pp. 379-389.

34. "It is even attended with considerable difficulty to print a volume the manuscript of which is written from 50-80 different hands." O.S.A. III (1792) p.x.

35. Sinclair, Sir John (1825) Analysis of the Statistical Account of Scotland.

36. N.S.A. I (1845) p.i.

37. Morgan V. (1969) op.cit. p.9.

38. E.g. "They are allowed to grow up in comparative ignorance of religion and its duties ... the decline of the morality ... neglect of the Sabbath ... the increase of profanity and crime." N.S.A. Cumbernauld VIII (1845) p.148.

39. E.g. "The sheep in this parish are the black-faced short Scotch sheep, and superior to those in the neighbouring parish." O.S.A. Douglas VIII (1793) p.80.

40. E.g. "This mountain looks like the sovereign of all the rest. Even in the month of June, he does not put off his snowy nightcap." N.S.A. North Knapdale VI (1845) p.260.

41. "No publication of equal information and curiosity has appeared in Great Britain since Domesday Book; and from the ample and authentic facts which it records, it must be resorted to by every future Statesman, Philosopher and Divine as the best basis that has ever yet appeared for political speculation." Dempster G. in O.S.A. I (1791) p.vii.

42. Paterson G. (1852) Historical Account of the Fiars in Scotland p.5.

43. Mitchison R. (1965) 'The Movement of Scottish corn prices in the seventeenth and eighteenth centuries' E.H.R. XVIII p.278; Paterson G. (1852) op.cit. p.8.

44. E.g. Lanarkshire fiars.

45. Mitchison R. (1965) op.cit. p.279.

46. Ibid. p.279; 48 Geo.III 138.

47. Paterson G. (1852) op.cit. p.19.

48. Mitchison R. (1965) op.cit. p.279.

49. Paterson G. (1852) op.cit. p.4.

50. Ibid. p.4.

51. Ibid. p.23.

52. Ibid. p.30-31; p.25.

53. Cleland J. (1832) Enumeration of the Inhabitants of Glasgow p.86.

54. Mitchison R. (1965) op.cit. p.279.

55. Paterson G. (1852) op.cit. p.33.

56. Conversion tables are conveniently set out in : Bald A. (1780) The Farmer and Corn Dealers' Assistant.

57. In 1808 they were formally accepted as the basis of clergy stipends. Mitchison R. (1965) op.cit. p.280. They were used to fix the rent of some farms. S.R.O. GD 25/9/78.

58. Whetham E.H. (1962) 'Prices and Production in Scottish farming 1850-1870' Scottish Journal of Political Economy IX p.235.

59. Cleland J. (1852) op.cit. p.86.

60. Scottish Record Office, Register House, Princes Street, Edinburgh and National Library of Scotland, George IV Bridge, Edinburgh.

61. H.M.S.O. (1968) A Century of Agricultural Statistics, 1866-1966 p.1

62. "From the jealousy and reluctance with which most of the tenants discovered to give an accurate account of their stock, I am unable to ascertain the precise number of either horses or black cattle." O.S.A. Sorn XV (1795) p.150.
"The inhabitants have shown great aversion to answer any question, tending to discover the real state of their stock, cattle or population." Ibid. Cadder VIII (1793) p.484.

63. Agricultural Statistics 1869. Parliamentary Papers 1869 (4200) 4xii 507.

64. See Minchinton W.E. (1953) 'Agricultural returns and the government during the Napoleonic Wars' Ag.H.R. I pp. 29-43.

65. H.M.S.O. (1968) op.cit. p.2.

66. Ibid. p.2.

67. Parliamentary Papers 1847 LIX (468) 11.

68. Ibid. 1852-53, CI (917) 173.

69. Ibid. 1854-55, XLVII (1876) 637; 1856 LIX (2) 369; 1857 XV (2154) 1; 1857-58 LVI (2307) 333.

70. H.M.S.O. (1968) op.cit. p.3.

71. Returns of 1854 p.3.

72. Returns of 1856 p.6.

73. Returns of 1854 p.3.

74. Returns of 1855 p.2.

75. H.M.S.O. (1968) op.cit. p.4. "Some county benches considered even voluntary returns to be inquisitorial" Ibid. p.3.

76. The reluctance shown at the time of the O.S.A. appeared to have abated.

77. Returns of 1854 p.3.

78. Returns of 1855 p.1.

79. Returns of 1855 p.3.
80. Catalogue AF 39 S.R.O.
81. June Returns 1870 p.3.
82. H.M.S.O. (1968) op.cit. p.4.
83. Catalogue AF 39 S.R.O.
84. Ibid.
85. Coppock J.T. (1958) 'The agricultural returns as a source for local history' Amateur Historian IV no.2 pp.49-55.
86. Returns of 1854 p.3.
87. H.M.S.O. (1968) op.cit. p.3.
88. Ibid. p.4.
89. Jones E.L. (1968) 'The changing basis of English agricultural prosperity 1853-73' in Minchinton W.E. (ed) (1968) Essays in Agrarian History Vol.II p.227.
90. They are to be found in West Register House, Charlotte Square, Edinburgh.

CHAPTER 2

1. Manley G. (1952) Climate and the British Scene p.257.
2. Vince S.W.E. 'The Highlands of Scotland' in Stamp L.D. (1944) The Land of Britain I p.443.
3. Ibid. p.444.
4. Ibid. pp.443, 447.
5. Ibid. pp.445-7.
6. Ibid. p.447.
7. Lebon J.H.G. 'Ayrshire' in Stamp L.D. (1937) The Land of Britain I p.9. Stamp L.D. 'Stirlingshire' in Stamp L.D. (1946) The Land of Britain p.360. Stamp L.D. 'Lanarkshire' in Stamp L.D. (1946) op.cit. p.296.
8. Stamp L.D. 'Lanarkshire' (1946) op.cit. p.299.
9. Lebon J.H.G. (1937) op.cit. p.11.
10. Ibid. p.12.
11. Moyes M.D. 'Renfrewshire' in Stamp L.D. (1946) op.cit.p.265. Lebon J.H.G. (1937) op.cit. p.9. Stamp L.D. 'Stirlingshire' (1946) op.cit. p.361.
12. Moyes M.D. (1946) op.cit. p.265. Stamp L.D. 'Lanarkshire' (1946) op.cit. pp.296-7.
13. Moyes M.D. (1946) op.cit. p.265. Stamp L.D. 'Lanarkshire' (1946) op.cit. p.296.
14. Stamp L.D. 'Lanarkshire' (1946) op.cit. pp.296-7.

15. Ibid. P.298.

16. Kirk W. (1957) 'The primary agricultural colonisation of Scotland' S.G.M. 73 pp. 64-99.

17. Caddell H.M. (1929) 'Land reclamation in the Forth valley' S.G.M. 45 pp.7-22, 81-89.

18. Kirk W. (1957) op.cit.

19. Evans J.G. 'Early farming communities in Britain' in Simpson D.D.A. (ed)(1971) Economy and Settlement in Neolithic and Early Bronze Age Britain and Europe p.19.

20. Ibid. p.19.

21. Clark J.G.D. (1952) Prehistoric Europe, the Economic Basis p.91.

22. Evans J.G. (1971) op.cit. p.20.

23. Ibid. p.22.

24. Renfrew C.(1973) Before Civilization p.34.

25. Symon J.A. (1959) Scottish Farming Past and Present p.12.

26. Small A. (1964-5) 'Excavations at Underhoull, Unst, Shetland' P.S.A.S. 98 pp.225-248.
Hamilton J.R.C. (1956) Excavations at Jarlshof H.M.S.O.

27. Smout T.C. (1969) A History of the Scottish People, 1560-1830 pp.21-24.

28. Ibid. pp.126-134.

29. Ibid. p.128.

30. Ibid. pp.113-114.

31. Fairhurst H. 'The rural settlement pattern of Scotland' in Steel R.W. & Lawton R. (ed)(1967) Liverpool Essays in Geography pp.196-8.

32. For general descriptions of the pre-improvement agricultural system in Scotland see :
Handley J.E. (1953) Scottish Farming in the Eighteenth Century.
Smout T.C. (1969) op.cit.
Grant I.F. (1930) The Social and Economic Development of Scotland before 1603.

33. Whyte I.D. (1974) 'Agrarian change in lowland Scotland in the seventeenth century' Unpub. Ph.D. thesis, Univ. of Edinburgh, pp.329-38.

34. Mitchison R. (1965) 'The movements of Scottish corn prices in the seventeenth and eighteenth centuries' E.H.R. 18 pp.280-3.
Smout T.C. (1963) Scottish Trade on the Eve of the Union : 1660-1707 pp.9-15.

35. Smout T.C. (1969) op.cit. pp.96-8.

36. Smout T.C. & Fenton A. (1965) 'Scottish agriculture before the Improvers - an exploration' A.H.R. 13 pp.73-93.

37. Whyte I.D. (1974) op.cit. p.416.

38. Smout T.C.(1963) op.cit. pp.206-14.

39. Whyte I.D. (1974) op.cit. pp.366-9.

40. Ibid. pp.205-46.
41. O'Dell A.C. (1953) 'A view of Scotland in the middle of the eighteenth century' S.G.M. 69 pp.58-63.
42. Hamilton H. (1963) An Economic History of Scotland in the Eighteenth Century pp.57-9.
43. Handley J.E. (1953) Scottish Farming in the Eighteenth Century pp.203, 207.
44. Smout T.C. (1969) op.cit. pp.287-302.
45. Slaven A. (1975) The Development of the West of Scotland 1750-1960 pp.32-57.
46. Smout T.C. (1969) op.cit. pp.226-7.
47. Prothero R.E. (Lord Ernle) (1961) English Farming Past and Present (6th edn) p.379.
48. Ibid. p.380.
49. Ibid. p.381.
50. Ibid. p.383.
51. Ibid. pp.389-91.
52. Ibid. p.391.
53. Ibid. p.395.
54. Ibid. p.396.
55. Whyte I.D. (1974) op.cit. pp.338-47.
56. Moir D.G. (1957) 'The roads of Scotland, Part II The Statute Labour Roads - the First Phase' S.G.M. 73 pp.101-10; 'the Second Phase' Ibid. pp.167-75.
57. Willam T.S. (1976) The Inland Trade p.40.
58. Whyte I.D. (1974) op.cit. PP.376-78.
59. E.g. the losses recorded by the burgh of Ayr in 'Register Cintaineing the State and Condition of Every Burgh Within the Kingdome of Scotland in the Year 1692' Misc.Scot.Burgh.Hist.Soc. (1881) p.77.
60. Slaven A. (1975) op.cit. pp.37-38.
61. Ibid. p.38.
62. Slaven A. (1975) op.cit. p.36.
63. Hadfield C. (1968) The Canal Age pp.7-16.
64. Lindsay J. (1968) The Canals of Scotland.
65. Ibid. p.55.
66. Ibid. p.89.
67. Graham P. (1812) A General View of the Agriculture of the County of Stirling p.332.
68. Hamilton H. (1932) The Industrial Revolution in Scotland p.237.
69. Youngson A.J. (1973) After the Forty-Five p.153.

70. O'Dell A. (1939) 'A geographical interpretation of the development of Scottish railways' S.G.M. 55 p.129.

71. Carter E.F. (1959) An Historical Geography of the Railways of the British Isles.

72. Thomas J. (1971) Regional History of the Railways of Great Britain. Vol. 6 Scotland: the Lowlands and Borders pp.24-8.

73. Ibid. p.28.

74. Carter E.F. (1959) op.cit. p.472-96.

75. Adams I.H. (1972) 'The historical geography of the Gifford and Garvald Light Railway' Trans.E.Loth.Antiq.Soc. 13 p.77.

76. Fullarton W. (1793) A General View of the Agriculture of the County of Ayr p.50.

77. Handley J.E. (1963) The Irish in Scotland pp.7-15.

78. Ibid. p.8; p.42 et.seq.

79. Lindsay J. (1968) op.cit. p.135.

CHAPTER 3

1. Scottish National Dictionary (tack).

2. "The land of Scotland generally is let in lease, is it not? Almost all without any exception worth noticing." Bill to Amend the Laws on Servants in Husbandry (1860) Vol. 1 Parliamentary Papers p.122 The granting of written leases became common in the 17th and 18th centuries. Whyte I.D. (1974) op.cit. pp.247-79.
Written leases were generally given in the Hebrides. Heron R. (1794) General View of the Agriculture of the Hebrides p.75.
There were some exceptions:
In Ayrshire, small tenants were not given leases because this would make them independent of the landlord. Aiton W. (1811) General View of the Agriculture of Ayrshire p.194.
In Argyllshire, some landlords gave no leases. Smith J. (1813) General View of the Agriculture of Argyllshire p.55.
In Eastwood, "by far the greater part of the parish is held by the tenants under verbal bargains, for the term of years noted in the proprietor's rent book." N.S.A. Eastwood Vol. VII (1845) p.40.

3. "The general prevalence of leases ... is the chief cause of the improvements in Scottish agriculture." Sinclair J. (1814) op.cit. Vol.I p.188.

4. E.g. S.R.O. GD 21/195. Lease stipulated in which years each field could be in pasture or in arable (Greenside, 10 years from Martinmas 1795).

5. E.g. S.R.O. GD 60/185. Tenant was allowed to cultivate farm as he chose for first 14 years (Lease of Glaik and Haggstone Muir, 24 years from Whitsun 1849).

6. Jones E.L. (1968) 'The changing basis of English agricultural prosperity, 1853-1873' in Minchinton W.E. (ed) Essays in Agrarian History Vol.II p.234.

7. E.g. S.R.O. GD 21/196. £8 per acre for breaking up land, and £4 for cutting grass contrary to agreement. NLS Acc 4322 £5 per acre for breaking up meadow or sheep pasture. NLS Ms 10854. 17 hens or 1s for each.

8. "The conditions of the lease as to cropping, are now generally enforced by exacting a higher rent for such part of the farm as may be differently managed." Thom W. in Sinclair J. (1814) op.cit. Appendix I p.315.

9. E.g. S.R.O. GD 25/9/78. December 1808, John Clymont paid £50 additional rent, the value of 100 acres of heath burnt contrary to his lease, and in 1813 another tenant paid £97 as a penalty for overploughing Turnberry Farm.

10. E.g. S.R.O. GD 1/393/46 Erskine of Cardross.

11. E.g. S.R.O. GD 118/21/31 Chancellor of Shieldhill.

12. Whyte I.D. (1974) op.cit. pp.247-79.

13. E.g. NLS 4322. Printed lease of Lockharts of Carnwath (1854).

14. "The theory of leases has nowhere received greater attention than in Scotland." Lavergne, Leonce de (1855) The Rural Economy of England, Scotland and Ireland p.291.

15. Chambers J.D. & Mingay G.E. (1966) The Agricultural Revolution p.165.

16. E.g. S.R.O. GD 112/2/3 Abatements allowed:

Crop	1819	15 1/6 %	
"	1820	3 1/4 %	
"	1821	-	
Crop	1822	14 1/2 %	
"	1823	13 1/2 %	
"	1824	23 1/2 %	

S.R.O. GD 112/10/2/2/1. Tenants of Nether Lorn were to have received abatements for crop 1851, if half the money was spent on improvements. 21 of them failed to do this, but 12 qualified for abatements.
S.R.O. GD 170/529. A tenant requested an abatement of £50, and got £40.

17. Mingay G.E. 'The Agricultural Revolution in English history: A' in Minchinton W. (ed) (1968) Essays in Agrarian History Vol.II p.16.

18. Sinclair (1814) op.cit. Vol.I p.188.

19. Chambers J.D. & Mingay G.E. (1966) op.cit. p.164-5.

20. Fullarton W. (1793) General View of the Agriculture of Ayrshire p.710.

21. Aiton W. (1811) op.cit. p.206.

22. E.g. S.R.O. GD 112/2/3 Tenants complained about services, and as a result it was considered whether they should be abolished.
S.R.O. GD 170/654/5. Tenant of Balure (1830) arranged with the proprietor that the gamekeeper would not be allowed through the corn and that smith service was to end, among other agreements.
S.R.O. GD 170/654/9 Tenant of Dalihulish (1828) arranged that no hunting was to take place at lambing time, and that marches were only to be altered if in dispute, among other agreements.

23. Aiton W. (1811) op.cit. p.203.

24. E.g. S.R.O. GD 64 leases of Jura estates; N.L.S. MS 5329 Castlemilk leases.

25. E.g. S.R.O. GD 242/64/3. Leases of Bankhead and Chappleton (1806): both have similar cropping clauses, but on only one farm is a new house to be built.

26. E.g. Jura and Castlemilk leases, similar to each other, but great differences between the leases of the estates.

27. Sinclair J. (1813) Account of Husbandry; (1814) General Report of Scotland; Kames, Lord (1776) The Gentleman Farmer.

28. Kames, Lord (1815) The Gentleman Farmer (6th edn) p.415.

29. Thom W. in Sinclair J. (1814) op.cit. Appendix Vol.I p.316.

30. E.g. coal under some lands in Glasgow Barony let for 19 years at £80 (1803) N.L.S. MS 6325 p.62.
Caprington Estate, profits from coal in 1843 amounted to £4, 609 3s 10d and in 1844 £4, 700 0s 0d S.R.O. GD 149/397.

31. E.g. N.L.S. Ms 10854. Compensation of 40s per acre for land resumed for coal-working.
S.R.O. GD 21/195 Compensation likewise 40s per acre.

32. E.g. S.R.O. GD 170/488/2 £2 2s 0d acre allowed for land taken for planting.
S.R.O. GD 242/59/4 The proprietor was allowed to plant up to 4 acres.

33. Sinclair J. (1813) op.cit. Vol.II p.221.

34. E.g. S.R.O. GD 60/159 Game to be preserved, penalty £5.
S.R.O. GD 60/185 Exception to this - tenant could shoot rabbits harming crops, if the proprietor had been given the option to do so.

35. E.g. N.L.S. Acc 4322. Tenant to insure buildings (1854).
S.R.O. GD 112/10/4/4/3 Property to be insured to value of £790.

36. Sinclair J. (1814) op.cit. Vol.I. p.195.

37. E.g. O.S.A. Carmunnock Vol.XVIII (1796) p.163; Colmonell Vol.II (1792) pp.69-70; Craignish Vol.VII (1793) p.441; Kilfinichen and Kilviceuen Vol.XIV (1795) p.198.

38. E.g. S.R.O. GD 112/2/3.

39. E.g. O.S.A. Kilmartin Vol.VIII (1793) p.102. Horse services remained, work services commuted. Kippen Vol.XVIII (1796)p.345. Most landlords took carriage services.

40. E.g. S.R.O. GD 1/393/46. Artificial manures of equal value could be substituted for quantities of dung to be laid down.

41. "Where there are no covenants ... the farm left in poverty and wretchedness." Sinclair (1813) op.cit. Vol.II p.217.
Aiton remarked on the need to prevent the land becoming impoverished. Aiton W. (1811) op.cit. p.202.

42. Sinclair J. (1814) op.cit. Vol.III p.384.

43. "It was customary to prescribe the mode of labouring the farm; which, until of late years was highly expedient, as agricultural information was not generally diffused among the farmers, by reading publications connected with the improvement and management of land ... The progress of agricultural knowledge, however, has rendered restrictions less necessary, and it is now only deemed requisite to prevent such a rotation of crops as may injure the land, or, to specify the quantity of fallow, of green, and of white crops." Thom W. in Sinclair J. (1814) op.cit. Appendix I p.315.

44. "Unnecessary restrictions in a lease are a great impediment to improvements, by precluding a spirit of enterprise, and of experiment."
Sinclair J. (1813) op.cit. Vol.II p.217.
Speaking of restrictions in leases, "which too frequently are arbitrary and injudicious." Sinclair J. (1814) op.cit. Vol.I p.427.

45. Smith J. (1813) op.cit. p.56.

46. Heron R. (1794) op.cit. p.75.

47. O.S.A. Campbeltown Vol.X (1794) p.549, Killean and Kilchenzie Vol.XIX (1797) p.630.

48. S.R.O. GD 170/488/2.

49. S.R.O. GD 170/568.

50. S.R.O. GD 170/568/4.

51. S.R.O. GD 170/568, GD 170/568, GD 170/569.

52. S.R.O. GD 112/10/2/5.

53. S.R.O. GD 112/10/2/2/5.

54. S.R.O. GD 112/10/2/2/3.

55. S.R.O. GD 112/10/4/4/3.

56. S.R.O. GD 112/10/2/2/3.
57. S.R.O. GD 112/10/5.
58. S.R.O. GD 112/10/6.
59. N.S.A. Kilbrandon and Kilchattan Vol.VII (1845) p.77.
60. S.R.O. GD 64/1/72, GD 64/1/73.
61. S.R.O. GD 64/1/77.
62. S.R.O. GD 64/1/75.
63. N.S.A. New Cumnock Vol.V (1845) p.520.
64. N.L.S. Acc 3525.
65. Gilmill, Gouiknest and Kirrigs; part of Overcastleton S.R.O. GD 247/56/K.
66. S.R.O. GD 21/195, GD 21/196, GD 21/247/1, GD 21/247/2, GD 21/253, GD 21/224.
67. Glaich and Haggstone; Meikle Bennan, Meikle Bennan S.R.O. GD 60/185.
68. S.R.O. GD 1/35/25/6.
69. S.R.O. GD 242/61/3.
70. S.R.O. GD 242/59/4.
71. S.R.O. GD 242/59/4.
72. S.R.O. GD 242/66/1.
73. Netherhall S.R.O. GD 242/64/3; Bankhead S.R.O. GD 242/64/3; Stakevelee GD 242/64/3.
74. S.R.O. GD 25/77.
75. S.R.O. GD 1/46/14.
76. S.R.O. GD 109/3752.
77. Whyte A. & Macfarlan D. (1811) General View of the Agriculture of Dumbartonshire p.48.
78. Whyte A. & Macfarlan D. (1811) op.cit. p.50.
79. N.S.A. Cardross Vol.VIII (1845) p.90.
80. S.R.O. GD 15/41.
81. S.R.O. GD 1/393/46.
82. S.R.O. GD 1/393/46.
83. Whyte A. & Macfarlan D. (1811) op.cit. p.47.
84. S.R.O. GD 101/955/11.
85. S.R.O. GD 101/955/12.
86. S.R.O. GD 101/955/26.
87. S.R.O. GD 47/1175.
88. S.R.O. GD 47/1174.
89. S.R.O. GD 47/1178.
90. S.R.O. GD 47/1187.

91. S.R.O. GD 47/1189 lease of Cladocheride; GD 47/1194 lease of Wester Portnellan.
92. S.R.O. GD 47/1196.
93. S.R.O. GD 47/1209.
94. S.R.O. GD 47/1210.
95. S.R.O. GD 47/1212.
96. Ure D. (1794) General View of the Agriculture of Dunbartonshire p.16
97. Whyte A. & Macfarlan D. (1811) op.cit. p.47.
98. Naismith J. (1798) General View of the Agriculture of Clydesdale p.67.
99. N.S.A. Carmichael Vol.VI (1845) p.529.
100. N.L.S. Acc 4322.
101. N.L.S. Ms 5329.
102. N.L.S. Ms 5329/118.
103. N.L.S. Ms 5329/147.
104. N.L.S. Ms 5329/122.
105. N.L.S. Ms 5329/151.
106. Loanhead S.R.O. GD 118/21/311; Roadhead S.R.O. GD 118/21/312.
107. N.L.S. Ms 8207.
108. N.L.S. Ms 8207.
109. S.R.O. GD 1/46/21/25.
110. S.R.O. GD 1/221/90.
111. S.R.O. GD 1/28/102.
112. Spittal S.R.O. GD 247/17/4; Caldlaw S.R.O. GD 247/17/L; Westside S.R.O. GD 247/17/L.
113. Wilson J. (1812) General View of the Agriculture of Renfrewshire p.82.
114. Ibid.
115. S.R.O. GD 101/955/13.
116. S.R.O. GD 101/955/15.
117. N.S.A. Eastwood Vol.VII (1845) p.40.
118. S.R.O. GD 47/1181.
119. S.R.O. GD 22/1/509.
120. S.R.O. GD 22/1/509.
121. Knockmountain, Bogside S.R.O. GD 22/1/509.
122. Wilson J. (1812) op.cit. p.83.
123. Ibid.
124. Belsches R. (1796) General View of the Agriculture of Stirlingshire p.20.

125. Graham P. (1812) General View of the Agriculture of Stirlingshire p.102.

126. Ibid. p.103.

127. S.R.O. GD 1/393/46.

128. N.S.A. Falkirk Vol.VIII (1845) p.15.

129. N.S.A. Campsie Vol.VIII (1845) p.250.

130. N.L.S. Ms 10854.

131. S.R.O. GD 35/90.

132. S.R.O. GD 60/159.

133. Middle Gouston 19 years from Martinmas 1791, Nether Harperstoun 14 years from Martinmas 1807, East and West Dunston 17 years from Martinmas 1812, all S.R.O. GD 22/1/1510.

134. S.R.O. GD 22/1/475.

135. S.R.O. GD 47/1165.

136. S.R.O. GD 47/1191.

137. S.R.O. GD 47/1211.

138. S.R.O. GD 47/1213.

139. S.R.O. GD 47/1214.

140. Belsches R. (1796) op.cit. p.20.

141. E.g. long leases were out of fashion in the 19th century. Mingay G.E. (1968) op.cit. p.16.

142. Lavergne L. de (1855) op.cit. p.288; Sinclair J. (1814) op.cit Vol.I p.191. O.S.A. Lochgoilhead and Kilmorich (1792) Vol.III p.191, Kilmarnock (1792) Vol.II p.101.

143. Lavergne L. de (1855) op.cit. p.288.

144. Belsches R. (1796) op.cit. p.20.

145. Ibid. p.20.

146. Robertson G. (1829) Rural Recollections p.533.

147. Graham P. (1812) op.cit. p.101.

148. N.L.S. Ms 5329/107.

149. N.L.S. Ms 5329/149.

150. N.L.S. Ms 5329/151.

151. S.R.O. GD 22/1/509.

152. S.R.O. GD 242/61/3.

153. S.R.O. GD 242/61/3.

154. Aiton W. (1811) op.cit. p.199.

155. O.S.A. Falkirk Vol.XIX (1797) p.82.

156. O.S.A. Lanark Vol.XV (1795) p.2.

157. O.S.A. Lanark Vol.XV (1795) p.17.

158. S.R.O. GD 22/1/489.

159. S.R.O. GD 22/3/555.

160. S.R.O. GD 221/393/46.

161. N.S.A. Ochiltree Vol.V (1845) p.112.

162. N.S.A. Blantyre Vol.VI (1845) p.322.

163. O.S.A. Carstairs Vol.XVIII (1796) p.177;
N.S.A. Carstairs Vol.VI (1845) p.559.

164. N.S.A. Kilbarchan Vol.VII (1845) p.375.

165. Ure D. (1794) op.cit. p.16.

166. Naismith J. (1798) op.cit. p.66.

167. Smout T.C. (1969) A History of the Scottish People p.272.

168. Ibid. p.272. "Of late years the price of corn has been comparatively so high, and the progress of agricultural improvement so rapid, that rents have greatly advanced, and therefore proprietors have been anxious to resume their lands as frequently as possible; accordingly, few leases are now granted for more than 19 years endurance."
Thom W. in Sinclair J. (1814) op.cit. Appendix I p.311, "For the last twenty or thirty years, long leases have certainly been against the interest of the landholders, owing to the great and rapid depreciation of money."
Kames Lord (1812) 6th edn. op.cit. p.541.

169. Mingay G.E. (1968) op.cit. p.16.

170. O.S.A. Kilmarnock Vol.II (1792) pp.101-2.

171. Sinclair J. (1814) op.cit. Vol.I p.191.

172. Kames Lord (1798) The Gentleman Farmer 4th edn. p.407.

173. E.g. Campsie O.S.A. Vol.XV (1795) p.342
Kirkoswald O.S.A. Vol.X (1794) p.481
Cadder N.S.A. Vol.VI (1845) p.410.

174. N.S.A. Rothesay Vol.V (1845) p.109.

175. Sturrock A. Report on the Agriculture of Ayrshire THASS 1866-7 p.105.

176. E.g. N.L.S. Ms 10685 p.90. Rent £90 for a 15 year tack or £95 for a 19 year one.

177. N.S.A. Erskine Vol.VII (1845) p.518.

178. N.S.A. Cumbernauld Vol.VIII (1845) p.151.

179. Wilson J. (1812) op.cit. p.81.

180. Graham P. (1812) op.cit. p.102.

181. Ibid. p.102.

182. N.S.A. East Kilbride Vol. VI (1845) p.898.

183. N.S.A. Stonehouse Vol.VI (1845) p.474.

184. N.S.A. Ardrossan Vol.V (1845) p.200; Ochiltree Vol.V (1845) p.112; New Cumnock Vol.V (1845) p.519; Old Cumnock Vol.V (1845) p.485; Stevenston Vol.V (1845) p.464.

185. Robertson G. (1829) op.cit. p.533.

186. Aiton W. (1811) op.cit. p.199.

187. S.R.O. GD 60/185.

188. S.R.O. GD 47/1177.

189. S.R.O. GD 247/56/K.

190. E.g. N.S.A. Kilcalmonell and Kilberry Vol.VII (1845) p.411 O.S.A. Ardchattan and Muckairn Vol.VI (1793) p.176.

191. N.S.A. Dunoon and Kilmun Vol.VII (1845) p.617.

192. N.S.A. Killean and Kilchenzie Vol.VII (1845) p.389.

193. E.g. S.R.O. GD 170/488/2, 16 years from 1791 S.R.O. GD 170/488/2, 15 years from 1793.

194. "in those districts where no leases, or leases of short duration, have been granted, no permanent improvements have been attempted." Sinclair J. (1814) op.cit. Vol.III p.380.
Also O.S.A. Ardchattan and Muckairn Vol.VI (1793) p.176; Buchananan Vol.IX (1793) p.19; Colmonell Vol.II (1792) p.69; Kilfinan Vol.XIV (1795) p.240; N.S.A. Crawford Vol.VI (1845) p.333; Pettinain Vol.VI (1845) p.543; Ochiltree Vol.V (1845) p.112.

195. Sinclair J. (1814) op.cit. Vol.III p.379.

196. Sinclair J. (1814) op.cit. Vol.I p.191.

197. Graham P. (1812) op.cit. p.101.

198. Ure D. (1794) op.cit. p.16.

199. N.S.A. Arrochar Vol.VIII (1845) p.98.

200. Naismith J. (1798) op.cit. p.66.

201. N.S.A. Crawford Vol.VI (1845) p.333.

202. Smith J. (1813) op.cit. p.55.

203. N.S.A. Ardchattan and Muckairn Vol.VII (1845) p.504; Glenorchy and Inishail Vol.VII (1845) p.99; Kilfinan Vol.VII (1845) p.368; Torosay Vol.VII (1845) pp.290-1.

204. N.S.A. Inverchaolain Vol.VII (1845) p.113; Gigha and Cara Vol.VII (1845) p.404; Kilmore and Kilbride Vol. VII (1845) p.528; Kilninver and Kilmelfort Vol.VII (1845) p.69.

205. N.S.A. Glassary Vol.VII (1845) p.690- Inverary Vol.VII (1845) p.30; Kilbrandon and Kilchattan Vol.VII (1845) p.77.

206. O.S.A. Craignish Vol.VII (1793) p.440; Kilninian Vol.XIV (1795) p.156.

207. S.R.O. GD 112/10/2/2/3.

208. S.R.O. GD 170/488/1b; 170/488/2.

209. S.R.O. GD 64/1/79.

210. S.R.O. GD 112/10/4/4/3.

211. S.R.O. GD 170/488/1b.

212. Mentioned as recent practice in N.S.A. of West Kilbride. No mention of it in O.S.A.

213. N.S.A. Auchinleck Vol.V (1845) p.327; Ochiltree Vol.V (1845) p.112; Muirkirk Vol.V (1845) p.155.

214. S.R.O. GD 21/247/1; GD 21/247/2.

215. N.S.A. Dalry Vol.V (1845) p.229; Galston Vol.V. (1845) p.184.

216. N.S.A. Mauchline Vol.V (1845) p.163; Stevenston Vol.V (1845) p.464.

217. N.S.A. Dalmellington Vol.V (1845) pp.317-8.

218. S.R.O. GD 247/17/L; GD 247/17/L.

219. N.S.A. Wandell and Lamington Vol.VI (1845) p.830; S.R.O. GD 242/61/3.

220. N.S.A. Kilcalmonell and Kilberry Vol.VII (1845) p.411; Luss Vol.VIII (1845) p.164; Craignish Vol.VII (1845)p.60.

221. Sinclair J. (1814) op.cit. Appendix Vol.II p.394.

222. "A lease merely verbal is not binding upon either party." Walter Thom in Sinclair J. (1814) op.cit. Appendix Vol.I p.316.

223. Heron R. (1794) op.cit. p.75.

224. S.R.O. GD 1/393/46.

CHAPTER 4

1. E.g. Oats

2. E.g. Turnips

Wheat

3. Smith J. General View of the Agriculture of Argyllshire (1813) p.108; Graham P. General View of The Agriculture of Stirlingshire (1812) p.147; N.S.A. Kirkintilloch Vol.VI (1845) p.197
Oats worth £3 10s per acre, wheat worth £9 - £10 per acre. "Wheat since it is the favourite cereal for the production of bread is the most important of the corn crops." Watson, James A.S. & More, James A.; Agriculture, The Science & Practice of British Farming (1924) p.139.

4. E.g. O.S.A. Symington Vol.V (1793) p.398; Straiton Vol.III (1792) p.588.

5. Sinclair J. General Report of The Agricultural State & Political Circumstances of Scotland (1814) Vol.I p.460.
6. Sinclair J. Account of The Systems of Husbandry adopted in the more improved districts of Scotland (1813) Vol.I p.263.
7. Ibid. p.259.
8. Sinclair J. (1814) op.cit. Vol.I p.460.
9. Ibid. p.460.
10. E.g. Triticum monococon & Triticum spelta, widely cultivated in Germany on poor soils, were renouned for their hardiness and were recommended for use in the Highlands. Sinclair J. (1814) op.cit. Vol.I p.463.
11. Ibid. p.448.
12. A brake was a heavy harrow used for tearing up obstinate weeds. It was usually triangular with long stout teeth. Graham P. (1812) op.cit. p.110.
13. Kames, Lord The Gentleman Farmer 6th Edn (1815) pp.116-118. In Stevenston the ground was ploughed four or five times between June and August for wheat O.S.A. Vol.VII (1793) p.31.
14. Kames, Lord (1815) op.cit. p.119.
15. Ibid. p.119.
16. Robertson George Rural Recollections (1829) p.595.
17. Sinclair J. (1814) op.cit. Vol.I p.469.
18. Ibid. p.457.
19. Ibid. p.454.
20. O.S.A. Kilfinan Vol.XIV (1795) p.243.
21. O.S.A. Southend Vol.III (1792) p.364.
22. Smith J. (1813) op.cit. p.108.
23. Ibid. p.108.
24. Walker J. An Economical History of The Hebrides and Highlands of Scotland (1808) p.226;
Macdonald J. General View of the Agriculture of The Hebrides (1811) p.195.
25. N.S.A. Southend Vol.VII (1845) p.433.
26. Report of the Highland and Agricultural Society of Scotland to the Board of Trade on the Agricultural Statistics of Scotland, hereafter known as Highland and Agricultural Society Census (1855) p.5.
27. June Returns (1870) Argyllshire S.R.O. AF 39/2/1.
28. Highland & Agricultural Society Census op.cit. (1855) p.5.
29. Highland & Agricultural Society Census op.cit. (1856) p.9.
30. Highland & Agricultural Society Census op.cit. (1857) p.7.

31. Parliamentary Papers 1866 (3727)LX 1; 1868 (4057)LXX 125.
32. Parliamentary Papers 1874 c1033 LXIX 627.
33. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.
34. Aiton W. General View of The Agriculture of Ayrshire (1811) p.258.
35. Fullarton W. General View of the Agriculture of Ayrshire (1793) p.24.
36. Auchinleck Vol.XI (1794) p.431; Ayr Vol.I (1791) p.92; Beith Vol.VIII(1793) p.315; Colmonell Vol.II (1792) p.63; Dalry Vol.XII (1794) p.96; DreghornVol.IV (1794) p.281; Dundonald Vol.VII (1793) p.621; Galston Vol.II (1792) p.75; Girvan Vol.XII (1794) p.341; W. Kilbride Vol.XII (1794)p.401; Kilmaurs Vol.IX (1793) p.360; Monkton Vol.XII (1794) p.400; Riccarton Vol.VI (1793) p.19; Sorn Vol.XX (1798) p.152; Stair Vol.VI (1793) p.113; Stevenston Vol.VII (1793) p.30; Straiton Vol.III (1792) p.588; and Symington Vol.V (1793) p.398.
37. O.S.A. Stevenston Vol.VII (1793) p.31; Riccarton Vol.VI (1793) p.19.
38. O.S.A. Stevenston Vol.VII (1793) p.31.
39. O.S.A. Sorn Vol.XX (1798) p.152.
40. O.S.A. Colmonell Vol.II (1792) p.63; Galston Vol.II (1792) p.75; Monkton Vol.XII (1794) p.400.
41. O.S.A. Girvan Vol.XII (1794) p.341; W. Kilbride Vol.XII (1794) p.409; Straiton Vol.III (1792) p.588; Symington Vol.V (1793) p.398.
42. O.S.A. Dalry Vol.XII (1794) p.96; Kilmarnock Vol.II (1792) p.103.
43. S.R.O. GD 25/9/47/1 Rental 1639.
44. O.S.A. Auchinleck Vol.XI (1794) p.431; Dalry Vol.XII (1794) p.96.
45. Aiton W. (1811) op.cit. p.258.
46. Fullarton W. (1793) op.cit. p.25; Aiton W. (1811) op.cit. p.260.
47. Sinclair J. (1814) op.cit. Vol.I p.460.
48. Fullarton W. (1793) op.cit. p.25; Aiton W. (1811) op.cit. p.260; O.S.A. Stevenston Vol.VII (1793) p.31.
49. Aiton W. (1811) op.cit. p.260.
50. Fullarton W. (1793) op.cit. p.25; Aiton W. (1811) op.cit. p.259.
51. Aiton W. (1811) op.cit. p.259.
52. N.S.A. Dalrymple Vol.V (1845) p.282.
53. Aiton W. (1811) op.cit. p.260.

54. S.R.O. GD 109/3798; GD 142/6/60.

55. Robertson G. (1829) op.cit. p.595.

56. N.S.A. Vol.V (1845) Ardrossan p.200; Auchinleck p.327; Ayr p.49; Ballantrae p.421; Colmonell p.530; Coylton p.658; Craigie p,767; Old Cumnock p.485; New Cumnock p.519; Dailly p.387; Dalry p.227; Dalrymple p.282; Dreghorn p.526; Dundonald p.680; Dunlop p.299; Girvan p.400; Kilbirnie p.712; West Kilbride p.262; Kilmarnock p.546; Kilmaurs p.771; Kilwinning p.828; Kirkoswald p.785; Largs p.802; Maybole p.370; Monkton & Prestwick p.175; Riccarton p.613; Saint Quivox p.121; Sorn p.138; Stevenston p.463; Stewarton p.734; Straiton p.342; Torbolton p.759.

57. N.S.A. Vol.V (1845) Dundonald p.680; Stair p.645-646.

58. N.S.A. Mauchline Vol.V (1845) p.168.

59. N.S.A. Dundonald Vol.V (1845) p.680.

60. N.S.A. Kilbirnie Vol.V (1845) p.713.

61. N.S.A. Kirkoswald Vol.V (1845) p.785.

62. N.S.A. Largs Vol.V (1845) p.802.

63. N.S.A. Coylton Vol.V (1845) p.658.

64. N.S.A. Vol.V (1845) Auchinleck p.327; Dunlop p.299; Torbolton p.759; Stewarton p.734.

65. N.S.A. Vol.V (1845) Dailly p.387; Girian p.400; Monkton & Prestwick p.175; Maybole p.370; West Kilbride p.262.

66. Highland & Agricultural Society Census (1854) p.6; (1855) p.5; (1856)p.9.

67. Ibid. (1857) p.7.

68. Parliamentary Papers 1866 (3727)LXI; 1872 c675 LXIII 675; 1867 (3941)LXXI 125.

69. Sturrock A. Report on the Agriculture of Ayrshire T.H.A.S.S. (1866-7) p.52-3.

70. June Returns (1870) Ayrshire. S.R.O. AF 39/3/1. Parishes were Dalmellington, Muirkirk, Cumnock and Auchinleck.

71. Aiton W. A General View of the Agriculture of The County of Bute (1816) p.188.

72. N.S.A. Vol.V (1845) Kilmorie p.61; Kilbride p.31.

73. N.S.A. Vol.V (1845) Kingarth p.91; Rothesay p.107 & 110.

74. Highland & Agricultural Society Census op.cit. (1854) p.6; (1855) p.5; (1856) p.9; (1857) p.7.

75. Parliamentary Papers 1866 (3727)LXI.

76. June Returns 1870 (Buteshire) S.R.O. AF 39/6.

77. Ure D. General View of Agriculture of Dumbartonshire (1794) p.51.

78. O.S.A. Kirkintilloch Vol.II (1792) p.278; N. Kilpatrick Vol.VII (1793) p.101; O. Kilpatrick Vol.V (1793) p.233; Cumbernauld Vol.VI (1793) p.463; Bonhill Vol.III (1792) p.450.

79. O.S.A. N. Kilpatrick Vol.VII (1793) p.101.

80. Whyte A. & Macfarlan D. General View of Agriculture of Dumbartonshire (1811) p.95.

81. Ure D. (1794) op.cit. p.51; Whyte & Macfarlan (1811) op.cit. p.97.

82. Whyte A. & Macfarlan D. (1811) op.cit. p.97.

83. Ure D. (1794) op.cit. p.50; Whyte & Macfarlan (1811) op.cit. p.100.

84. Whyte A. & Macfarlan D. (1811) op.cit. p.99-100.

85. N.S.A. Vol.VIII (1845) Kirkintilloch p. 199; Old Kilpatrick p.25.

86. N.S.A. N. Kilpatrick Vol.VIII (1845) p.56 & 63.

87. N.S.A. Cumbernauld Vol.VIII (1845) p.150.

88. Highland & Agricultural Society Census (1855) p.5; (1856) p.9; (1857) p.7.

89. Parliamentary Papers 1866 (3727)LXI; 1872 c675 LXIII 675; 1874 c1033 LXIX 627.

90. June Returns 1870 (Dumbartonshire) S.R.O. AF 39/10/1.

91. Naismith J. General View of Agriculture of Lanarkshire (1794) p.62.

92. Ibid. p.62.

93. Ibid. (1798) p.85.

94. O.S.A. Lamington Vol.VI (1793) p.554; Douglas Vol.VIII (1793) p.79.

95. O.S.A. Blantyre Vol.II (1792) p.218; Bothwell Vol.XVI (1795) p.310; Lanark Vol. XV (1795) p.18; Lesmahagow Vol.VII (1793) p.427; Stonehouse Vol.II (1792) p.224.

96. O.S.A. Rutherglen Vol.IX (1793) p.2; W. Monkland Vol.VII (1793) p.378; E. Monkland Vol.VII (1793) p.570; Govan Vol.XIV (1795) p.287; Carmunnock Vol.XVIII (1796) p.160; Cambusnethan Vol.XII (1794) p.570 N.L.S. Ms 5329/169.

97. O.S.A. Cambuslang Vol.V (1793) p.247-8.

98. O.S.A. Dalserf Vol.II (1792) p.377; Hamilton Vol.II (1792) p.185-6.

99. N.S.A. Wandell & Lamingtoune Vol.VI (1845) p.845.

100. N.S.A. Carnwath Vol.VI (1845) p.85.

101. N.S.A. Vol.VI (1845) Avondale p.307; Cambuslang p.434.

102. N.S.A. Vol.VI (1845) Biggar p.366; Cadder p.410; Cambuslang p.434; Govan p. 696.

103. N.S.A. Vol.VI (1845) Bothwell p.795; Hamilton p.279,

104. N.S.A. Vol.VI (1845) Dalserf p.742.

105. N.S.A. Vol.VI (1845) Glassford p.299; Coulter p.349; Dalziel p.456.

106. Highland & Agricultural Society Census (1854) p.6; (1855) p.5; (1856) p.9; (1857) p.7.

107. Parliamentary Papers 1866 (3727)LXI; 1872 c675 LXIII 675.

108. Parliamentary Papers 1867 (3941)LXXI 125.

109. June Returns 1870 (Lanarkshire) S.R.O. AF 39/20/1.

110. Irving G.V.I. & Murray A. The Upper Ward of Lanarkshire Described & Delineated (1864) Vol.I Dolphinton p.364; Wiston & Roberton p.148.

111. Ibid. Vol.III p.2.

112. June Returns 1870 (Lanarkshire) op.cit. S.R.O. AF 39/20/1.

113. Wilson J. General View of the Agriculture of Renfrewshire (1812) p.100.

114. O.S.A. Cathcart Vol.V (1793) p.343.

115. O.S.A. Paisley Abbey Vol.VII (1793) p.85; Renfrew Vol.II (1792) p.173; Inchinnan Vol.III (1792) p.533.

116. O.S.A. Erskine Vol.IX (1793) p.64; Houston & Killallan Vol.I (1791) p.323-4.

117. O.S.A. Kilbarchan Vol.XV (1795) p.499.

118. N.S.A. Paisley Vol.VII (1845) p.258.

119. N.S.A. Vol.VII (1845) Cathcart p.507; Eastwood p.39; Erskine p.518; Mearns p.523; Renfrew p.23.

120. Highland & Agricultural Society Census (1854) p.6; (1855) p.5; (1856) p.9; (1857) p.7.

121. Parliamentary Papers 1866 (3727)LXI.

122. Parliamentary Papers 1872 c675 LXIII 675; 1873 c878 LXIX 301.

123. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.

124. Graham P. General View of the Agriculture of Stirlingshire (1812) p.147.

125. Ibid.

126. Ibid.

127. Ibid.

128. O.S.A. Strathblane Vol.XVIII (1796) p.567.

129. O.S.A. Kilsyth Vol.XVIII (1796) p.281.

130. O.S.A. Killearn Vol.XVI (1795) p.114; Kippen Vol.XVIII (1796) p.285.

131. O.S.A. Denny Vol.II (1792) p.421.

132. O.S.A. Baldernock Vol. XV (1795) p.276.

133. O.S.A. Airth Vol.III (1792) p.490
N.L.S. Ms 10835; 10833; 10829; 10831.

134. O.S.A. Gargunnock Vol.XVIII (1795) p.107.

135. O.S.A. Alva Vol.XVIII (1795) p.130; St Ninians Vol.XVIII (1795) p.389; Bothkennar Vol.XVII (1796) p.296.

136. Graham P. (1812) op.cit. p.147.

137. N.S.A. Vol.VIII (1845) Bothkennar p.202; Falkirk p.15; Larbert p.371; Polmont p.197; St Ninians p.327.

138. N.S.A. Vol.VIII (1845) Kippen p.269; St Ninians p.327; Logie p.230; Stirling p.429.

139. N.S.A. Vol.VIII (1845) Kilsyth p.157.

140. N.S.A. Vol.VIII (1845) Dunipace p.383.

141. N.S.A. Vol.VIII (1845) Slamannan p.277.

142. Highland & Agricultural Society Census 1854 p.6.

143. Parliamentary Papers 1866 (3727)LXI; 1869 (4200)LXII 507.

144. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

145. At the height of the Napoleonic Wars in 1812, Sinclair wrote "The growth of wheat has greatly increased in Scotland. It is not only more frequently introduced into rotations, but it is also cultivated in many districts where it was formerly unknown and in situations where, from their elevation it was formerly thought impossible to raise it." Sinclair J. (1813) op.cit. Vol.I p.259.

146. Irving G.V.I. & Murray A. (1864) op.cit. Vol.III p.2.

Barley

1. Sinclair J. (1814) op.cit. Vol.I p.486.

2. Two-rowed barley, Hordeum distichon; four-rowed barley, Hordeum vulgare or tetrastichon. There was also a six-rowed barley, Hordeum hexastichon, but this was not in common use in Scotland. Sinclair J. (1814) op.cit. Vol.I p.491.

3. The term bere will be used throughout the thesis in order to avoid confusion.

4. Sinclair J. (1814) op.cit. Vol.I. p.492.

5. Sinclair J. (1814) op.cit. Vol.I. P.492-4.

6. Ibid.

7. Sinclair J. (1814) op.cit. Vol.I p.486.

Duty On Distilling

	Lowland Stills	Highland Stills
1788-93	£3	£1
1793-95	£9	£1.10.0
1795-96	£18	£2.10.0
1796-97	£54	£2.10.0
1797-98	£54	£6.10.0

There was a complete prohibition on distilling between September 1795 and October 1796, owing to shortages of corn as a result of war. Weir R.B. The Distilling Industry in Scotland in the Nineteenth Century and Early Twentieth Century, Unpub. Ph.D. Thesis, Univ. of Edinburgh (1974).

8. Mellow meaning rich and loamy.
9. Kames, Lord (1815) op.cit. p.124.
10. Ibid. p.125.
11. Sinclair J. (1814) op.cit. Vol.I p.487.
12. Ibid.
13. Sinclair J. (1814) op.cit. Vol.I p.488.
14. Barley was drilled in Colonsay and this used one third less seed than the broadcast method. The crop did well even on poor soils, Macdonald J. (1811) op.cit. p.199.
15. Sinclair J. (1814) op.cit. Vol.I p.490.
16. Sinclair J. (1814) op.cit. Vol.I p.487.
17. Kames, Lord (1815) op.cit. p.471; O.S.A. Erskine Vol.IX (1793) p.64.
18. Macdonald J. (1811) op.cit. p.201.
19. Robson J. (1794) op.cit. pp.53, 55, 57, 26, 57; Macdonald J. (1811) p.19.
20. Smith J. (1813) op.cit. p.88.
21. Smith J. (1813) Ibid. p.92.
22. Macdonald J. (1811) op.cit. p.196.
23. Barley/bere was grown in Ardchatton and Muckairn Vol.VI (1793) p.176; Ardnamurchan Vol.XX (1798) p.295; Cambeltown Vol.X (1794) p.549; Craignish Vol.VII (1793) p.441; Gigha & Cara Vol.VIII (1793) p.49; Glassary Vol.XIII (1793) p.655; Glenorchy & Inishail Vol.VIII (1793) p.337; Inverchaolain Vol.V (1793) p.466; Jura & Colonsay Vol.XII (1794) p.320; Kilcalmonnel Vol.X (1794) p.60; Kilchonon Vol.XI (1794) p.277; Kildalton Vol.XI (1794) p.288; Kilfinichen Vol.VIX (1795) p.194; Kilfinan Vol.XIV (1795) p.242-3; Killarrow Vol.XI (1794) p.300; Kilbrandon & Kilchattan Vol.XIV (1795) p.158; Killean & Kilchenzie Vol.XIX (1797) p.630; Kilmadan Vol.IV (1792) p.339; Kilmalie Vol.VIII (1793) p.425; Kilmartin Vol.VIII (1793) p.99; (continued)

23. (Continued)
Kilmore & Kilbride Vol.XI (1794) p.124; Kilninian Vol.XIV (1795) p.141; N. Knapdale Vol.II (1792) p.263; S. Knapdale Vol.XIX (1797) p.319; Lismore & Appin Vol.I (1791) p.489; Lochgoilhead & Kilmorich Vol.III (1792) p.171; MorvernVol.X (1794) p.265; Saddell & Skipness Vol.XII (1794) p.476; Southend Vol.III (1792) p.364; Strachur & Stralachlan Vol.IV (1792) p.565; Tiree Vol.X (1794) p.395.

24. O.S.A. Kilninian Vol.XIV (1795) p.141.

25. O.S.A. Lismore & Appin Vol.I (1791) p.490.

26. O.S.A. Southend Vol.III (1792) p.364.

27. O.S.A. Campbeltown Vol.X (1794) p.549 & 557.

28. O.S.A. Kilmartin Vol.VIII (1793) p.100; Kildalton Vol.XI (1794) p.296.

29. Smith J. (1813) op.cit. p.114.

30. Robertson G. (1829) op.cit. p.596-7.

31. N.S.A. Vol.VII (1845) Dunoon p.616; Kilfinichen p.308.

32. N.S.A. Vol.VII (1845) Killean p.391.

33. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

34. Parliamentary Papers 1866 (3727)LX 1; 1870 c223 LXVIII 363.

35. Parliamentary Papers 1873 c878 LXIX 301; 1874 c1033 LXIX 627.

36. Inverchaolain, Dalavich, N. Knapdale, Kilmaden & Kilmartin grew no barley. S.R.O. AF 39/2/1 op.cit.

37. Fullarton W. (1793) op.cit. p.26.

38. Aiton W. (1811) op.cit. p.261.

39. It was mentioned in Ayr Vol.I (1791) p.92; Auchinleck Vol.II (1792) p.431; Ballantrae Vol.I. (1791) p.107; Beith Vol.VIII (1793) p.315; Colmonnel Vol.II (1792) p.62; Craigie Vol.V (1793) p.371; New Cumnock Vol.VI (1793) p.100; Dailly Vol.X (1794)p.37; Dalry Vol.XII (1794) p.94; Dreghorn Vol.IV (1792) p.281; Dundonald Vol.VII (1793) p.621; Galston Vol.II (1792)p.75; Girvan Vol.XII (1794) p.340; W. Kilbride Vol.XII (1794) p.409; Kilmaurs Vol.IX (1793) p.360; Kilwinning Vol.II (1792) p.152; Kirkmichael Vol.VI (1793) p.103; Kirkoswald Vol.X (1794) p.486; Largs Vol.XVII (1796) p.505; Loudoun Vol.III (1792) p.107; Monkton & Prestwick Vol.XII (1794) p.398; Muirkirk Vol.VII (1793) p.604; Newton-upon-Ayr Vol.II (1792) p.265; Ochiltree Vol.V (1793) p.447; Riccarton Vol.VI (1793) p.119; Sorn Vol.XX (1798) p.148; Stair Vol.VI (1793) p.113; Stevenston Vol.VII (1793) p.30; Straiton Vol.III (1792) p.588; Symington Vol.V (1793) p.398; Tarbolton Vol.XIX (1797) p.455.

40. O.S.A. Kilmaurs Vol.IX (1793) p.360; Galston Vol.II (1792) p.75.

41. O.S.A. Ballantrae Vol.I (1791) p.107; Kirkoswald Vol.X (1794) p.490.

42. O.S.A. Kirkoswald Vol.X (1794) p.490.

43. Although crops were listed, barley was not mentioned in N.S.A. Vol.V (1845) Ardrossan pp.191-210, Ayr pp.1-85, Coylton pp.649-665, Dalmellington pp.308-322, Dalry pp.210-242, Galston pp.178-191, Kilwinning pp.811-834, Maybole pp.348-380. Little or no barley was grown in Kirkoswald p.785.

44. N.S.A. Vol.V (1845) Auchinleck p.327; Craigie p.767; Monkton p.178.

45. N.S.A. Vol.V (1845) Dalrymple p.283; Dunlop p.299.

46. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7. Parliamentary Papers 1866 (3727)LXI.

47. Sturrock A. (1866-7) op.cit. p.52.

48. June Returns 1870 (Ayrshire) S.R.O. AF 39/3/1.

49. Heron, Robert General View of the Agriculture of The Hebrides (1794) p.55-56.

50. O.S.A. Kingarth Vol.I (1791) p.309.

51. O.S.A. Kilbride Vol.III (1793) p.578; Kilmorie Vol.IX (1793) p.169.

52. O.S.A. Kilmorie Vol.IX (1793) p.170.

53. Headrick, Jones View of the Mineralogy, Agriculture, Manufactures and Fisheries of the Island of Arran (1807)

54. Aiton, William General View of the Agriculture of the County of Bute (1816) p.188.

55. N.S.A. Vol.V (1845) Kilbride p.31; Kilmorie p.61.

56. N.S.A. Kingarth Vol.V p.91.

57. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

58. Parliamentary Papers 1866 (3727)LX 1.

59. June Returns 1870 (Buteshire) AF 39/6.

60. Ure D. (1794) op.cit. p.50.

61. E.g. O.S.A. Cardross Vol.XVII (1796) p.210; Cumbernauld Vol.VI (1793) p.463; Luss Vol.XVII (1796) p.259; Kirkintilloch Vol.II (1792) p.278; Old Kilpatrick Vol.V (1793) p.233; New Kilpatrick Vol.VII (1793) p.101; Rhu Vol.IV (1792) p.407.

62. O.S.A. Rhu Vol.IV (1793) p.407.

63. O.S.A. Luss Vol.XVII (1796) p.259.

64. Whyte A. & Macfarlan D. (1811) op.cit. p.101.

65. Ibid.

66. Ibid. p.102.

67. Ibid.

68. Ibid. p.103.

69. Ibid.

70. Ibid. p.145.

71. N.S.A. Vol.VIII (1845) Cumbernauld p.149; Kirkintilloch p.197; New Kilpatrick p.54; Old Kilpatrick p.25.

72. N.S.A. Vol.VIII (1845) New Kilpatrick p.57; Old Kilpatrick p.25.

73. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

74. Parliamentary Papers 1866 (3727)LX 1; 1867 (3941)LXXI 125; 1868 (4057)LXX 125.

75. June Returns 1870 (Dunbartonshire) S.R.O. AF 39/10/1.

76. Naismith J. (1794) op.cit. p.62-64.

77. O.S.A. Carmichael Vol.XIII (1794) p.368; Carnwath Vol.X (1794) p.328; Crawford Vo.IV (1792) p.508; Culter Vol.VI (1793) p.76; Lamington Vol.VI (1793) p.554; Lanark Vol.XV (1795) p.17; Pettinain Vol.XII (1794) p.33; Wistoun Vol.VI (1793) p.307.

78. O.S.A. Blantyre Vol.II (1792) p.218; Carnworth Vol.X (1794) p.328.

79. O.S.A. Shotts Vol.XV (1795) p.51-2.

80. O.S.A. Bothwell Vol.VXI (1795) p.311.

81. O.S.A. Lesmahagoe Vol.VII (1793) p.428.

82. O.S.A. Cambuslang Vol.V (1793) p.247; Hamilton Vol.II (1792) p.185.

83. O.S.A. Dalserf Vol.II (1792) p.376.

84. For instance Vol.VI (1845) Govan p.696, Carmunnock p.604, Glasford p.299, Dalziel p.456.

85. N.S.A. Vol.VI (1845) Avondale p.307; Biggar p.366; Carnworth p.85; Carstairs p.559; Douglas p.486; Lanark p.21; Pettinain p.544; Stonehouse p.473; Wandell & Lammington p.828.

86. N.S.A. Vol.VI (1845) Cambuslang p.434.

87. N.S.A. Vol.VI (1845) Cadder p.410; Biggar p.366; Carmichael p.530.

88. N.S.A. Vol.VI (1845) Hamilton p.279.

89. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

90. Parliamentary Papers 1866 (3727)LX 1; 1869 (4200)LXII 507.

91. Ibid. 1870 c223 LXVIII 363; 1874 c1033 LXIX 627.

92. June Returns 1870 (Lanarkshire) AF 39/20/1.

93. Martin A. (1794) op.cit. p.8 (Spiers); p.11 (Abbey, Eastwood & Mearns).

94. It was mentioned in Erskine Vol.IX (1793) p.64; Houston & Killallan Vol.I (1791) p.323; Inchinnan Vol.III (1792) p.533; Innerkip Vol.IX (1793) p.96; Kilbarchan Vol.XV (1795) p.499; Kilmalcolm Vol.IV (1792) p.276; Lochwinnoch Vol.XV (1795) p.73; Mearns Vol.XVII (1796) p.306; Paisley Abbey Vol.VII (1793) p.85; Renfrew Vol.II (1792) p.173.

95. O.S.A. Houston & Killallan Vol.I (1791) p.323.

96. O.S.A. Lochwinnoch Vol.XV (1795) p.73; Innerkip Vol.IX (1793) p.97; Kilmalcolm Vol.IV (1792) p.271.

97. O.S.A. Kilbarchan Vol.XV (1795) p.499; Paisley Abbey Vol.VII (1793) p.85.

98. O.S.A. Renfrew Vol.II (1792) p.173; Erskine Vol.IX (1793) p.64.

99. Wilson J. (1812) op.cit. p.100.

100. N.S.A. Vol.VII (1845) Erskine p.518*, Mearns p.523, Paisley p.258.

101. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7;

102. Parliamentary Papers 1866 (3727)LX 1; 1867 (3941)LXXI 125; 1869 (4200)LXII 507; 1870 c223 LXVIII 363.

103. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.

104. Belsches R.(1796) op.cit. p.30.

105. Ibid. The fiars showed a difference of 5-20% in the price of Carse, Dryfield & Muirland barley.

106. E.g. Fintry Vol.XI (1794) p.373; Kilsyth Vol.XVIII (1796) p.287; Strathblane Vol.XVIII (1796) p.566.

107. O.S.A. Finry Vol.XI (1794) p.373.

108. O.S.A. Strathblane Vol.XVIII (1796) p.566.

109. O.S.A. Kilsyth Vol.XVIII (1796) p.287; BaldernockVol.XV (1795) p.275-6.

110. O.S.A. Buchanan Vol.IX (1793) p.19.

111. O.S.A. Airth Vol.III (1792) p.490.

112. Graham P. (1812) op.cit. p.156.

113. Ibid.

114. Ibid.

115. Ibid.

116. N.S.A. Vol.VIII (1845) Baldernock p.172, Buchanan p.97; Killearn p.69; Strathblane p.85.

117. N.S.A. Vol.VIII (1845) Polmont p.197.

118. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

119. Parliamentary Papers 1866 (3727)LX 1.

120. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

121. In the early part of the century inferior barley had been given to horses, and the awns to cattle. Sinclair J. (1814) Vol.I op.cit. p.499. Grain prices were fairly steady for about 20 years after the Crimean War as a result of imports. Beef prices, however, rose and it therefore became worthwhile to use grain as fodder from about 1857. Jones E.L. Agriculture and The Industrial Revolution (1974) p.194-5. "For the feeding of farm stock, barley and its by-products have a very high value." Watson J.A. & More J. (1924) op.cit. p.169.

122. Whetham E. Livestock Prices in Britain, 1851-93. A.H.R. Vol.XI(1) 1963 pp.27-35.

123. June Returns 1870 S.R.O. AF 39.

124. "All the best barley, however, is used for malting." Watson J.A.S. & More J.A. (1924) op.cit. p.169.

125. N.S.A. Vol.VI (1845) p.434.

Oats

1. "it will grow on the worst soil with very little preparation. Kames, Lord (1815) op.cit. p.124; Sinclair J. (1813) Vol.I op.cit. p.268; "The oat is the most extensively cultivated cereal in this country" Watson J.A.S. & More J.A. (1924) op.cit. p.155.

2. H.M.S.O. (1968) op.cit. p.36.

3. Sinclair J. (1814) Vol.I op.cit. p.501. Avena sativa

4. Ibid. p.501.

5. Ibid. p.502.

6. Ibid. p.504. Recently used in Hebrides McDonald J. (1811) op.cit. p.209.

7. Sinclair J. (1814) Vol.I op.cit. p.504.

8. Ibid. p.505.

9. Ibid. p.502-506.

10. Ibid. p.500.

11. Kames, Lord (1815) op.cit. p.121.

12. Ibid. p.123.

13. Sinclair J. (1814) Vol.I op.cit. p.500

14. Ibid. p.501.

15. Fullarton J. (1793) op.cit. p.28; Macdonald J. (1811) op.cit. p.201.
16. Sinclair J. (1813) Vol.I op.cit. p.268.
17. Ibid. Kames Lord (1815) op.cit. p.124, "The culture of oats is the simplest of all."
18. Robson J. (1794) op.cit. p.19; p.24.
19. Ibid. p.26; p.57.
20. Ibid. p.53.
21. Macdonald (1811) op.cit. p.209-212.
22. O.S.A. Kilbrandon & Kilchattan Vol.XIV (1795) p.158.
23. O.S.A. Glenorchy & Inishail Vol.VIII (1793) p.337; Kilfinichen Vol.XIV (1795) p.192.
24. O.S.A. Tiree Vol.X (1794) p.395-6.
25. O.S.A. Morvern Vol.X (1794) p.264-5.
26. O.S.A. Kilninian Vol.XIV (1795) p.141.
27. O.S.A. Jura & Colonsay Vol.XII (1794) p.320; Kilcalmonnel & Kilberry Vol.X (1794) p.67; Tiree Vol.X (1794) p.395; Glenorchy & Inishail Vol.VIII (1793) p.337; Killarrow & Kilmenny Vol.XI (1794) p.299; Kilbrandon & Kilchattan Vol.XIV (1795) p.159; Killean & Kilchenzie Vol.XIX (1797) p.630; Kilfinan Vol.XIV (1795) p.243; Kilmartin Vol.VIII (1793) p.103; Kilmore Vol.IXI (1794) p.124; Kilninian Vol.XIV (1795) p.141; Lochgoilhead & Kilmorich Vol.III (1792) p.171.
28. O.S.A. Inverchaolain Vol.V (1793) p.466.
29. O.S.A. Glenorchy & Inishail Vol.VIII (1793) p.337; Craignish Vol.VII (1793) p.441.
30. Smith J. (1813) p.85.
31. Ibid. p.86.
32. Ibid. p.87.
33. N.S.A. Vol.VII (1845) Gigha & Cara p.403; Inverchaolain p.113.
34. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
35. Parliamentary Papers 1866 (3727)LX 1.
36. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.
37. Fullarton W. (1793) p.27.
38. Ibid.
39. Ibid.
40. O.S.A. Craigie Vol.V (1793) p.371; Dalry Vol.XII (1794) p.94; Dunlop Vol.IX (1793) p.536.
41. O.S.A. Kirkmichael Vol.VI (1793)p.103; Riccarton Vol.VI (1793) p.119.

42. O.S.A. Stevenston Vol.VII (1793) p.30; Ballantrae Vol.I (1791) p.107; Kilmaurs Vol.IX (1793) p.360.
43. O.S.A. Kilmaurs Vol.IX (1793) p.360.
44. O.S.A. Kirkoswald Vol.X (1794) p.490.
45. O.S.A. Dailly Vol.X (1794) p.42; Symington Vol.V (1793) p.401.
46. O.S.A. Colmonell Vol.II (1792) p.62.
47. O.S.A. Straiton Vol.III (1792) p.588.
48. Aiton W. (1811) op.cit. p.262.
49. Ibid. p.270.
50. N.S.A. Vol.V (1845) Craigie p.767.
51. N.S.A. Vol.V (1845) Dalrymple p.283.
52. Ibid.
53. N.S.A. Vol.V (1845) Tarbolton p.759.
54. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
Parliamentary Papers 1866 (3727)LX 1.
55. Sturrock A. (1866-7) op.cit. p.50.
56. June Returns 1870 (Ayrshire) S.R.O. AF 39/3/1.
57. Heron, R. (1794) op.cit. p.55-56.
58. O.S.A. Kingarth Vol.I (1791) p.309.
59. O.S.A. Kilmorie Vol.IX (1793) p.169-170.
60. O.S.A. Kilbride Vol.VIII (1793) p.578.
61. Headrick, James (1807) op.cit. p.331.
62. Aiton W. (1816) op.cit. p.189.
63. N.S.A. Vol.V (1845) Kilbride p.30; Kilmorie p.60-61.
64. N.S.A. Vol.V (1845) Kilbride p.31.
65. N.S.A. Vol.V (1845) Kingarth p.91.
66. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
67. Parliamentary Papers 1866 (3727)LX 1.
68. June Returns 1870 (Buteshire) S.R.O. AF 39/6.
69. Ure D. (1794) op.cit. p.49.
70. Ibid.
71. Ibid.
72. O.S.A. Row (Rhu) Vol.IV (1792) p.407.
73. O.S.A. Luss Vol.XVII (1796) p.259.
74. Whyte A. & Macfarlan D. (1811) op.cit. p.104.

75. Ibid.
76. Ibid. p.105.
77. N.S.A. Vol.VIII (1845) Kilmarnock p.216.
78. N.S.A. Vol.VIII (1845) New Kilpatrick p.57.
79. N.S.A. Vol.VIII (1845) Old Kilpatrick p.25.
80. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
81. Parliamentary Papers 1866 (3727)LX 1; 1869 (4200)LXII 507.
82. Ibid. 1871 c460 LXIX 271; 1874 c1033 LXIX 627.
83. June Returns 1870 (Dunbartonshire) S.R.O. AF 39/10/1.
84. Naismith J. (1798) op.cit p.85.
85. Ibid.
86. Ibid. p.86.
87. O.S.A. Cambuslang Vol.V (1793) p.248.
88. O.S.A. Lesmahagow Vol.VII (1793) p.427.
89. O.S.A. Douglas Vol.VIII (1793) p.79.
90. O.S.A. East Kilbride Vol.III (1792) p.423.
91. O.S.A. Dolphington Vol.XIV (1795) p.109.
92. O.S.A. Cambusnethan Vol.XII (1794) p.569.
93. O.S.A. Carmunnock Vol.XVIII (1796) p.160; East Monkland Vol.VII (1793) p.270; Cambusnethan Vol.XII p.569; Blantyre Vol.II (1792) p.217.
94. O.S.A. Carmichael Vol.XIII (1794) p.368.
95. O.S.A. Libberton Vol.II (1792) p.239; Walston Vol.VII (1793) p.119.
96. N.S.A. Vol.VI (1845) Biggar p.366; Cambuslang p.434; Cadder p.410.
97. N.S.A. Vol.V (1845) Pettinain p.542; Douglas p.486.
98. N.S.A. Vol.VI (1845) Hamilton p.279.
99. Ibid.
100. N.S.A. Vol.VI (1845) Douglas p.486.
101. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
102. Parliamentary Papers 1866 (3727)LX 1.
103. June Returns 1870 (Lanarkshire) S.R.O. AF 39/20/1.
104. Martin A. (1794) op.cit.
105. O.S.A. Inchinnan Vol.III (1792) p.533; Kilmalcolm Vol.IV (1792) p.276; Innerkip Vol.IX (1793) p.97; Lochwinnoch Vol.XV (1795) p.73; Houston & Killallan Vol.I (1791) p.323.

106. O.S.A. Mearns Vol.XVII (1796) p.306.

107. Wilson J. (1812) op.cit. p.100.

108. N.S.A. Vol.VII (1845) Paisley p.259.

109. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
Parliamentary Papers 1866 (3727)LX 1.

110. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.

111. Belsches R.(1796) op.cit. p.30.

112. Ibid.

113. O.S.A. Fintry Vol.II (1792) p.373.

114. O.S.A. Kippen Vol.XVIII (1796) p.285.

115. O.S.A. Strathblane Vol.XVIII (1796) p.568.

116. O.S.A. Kilsyth Vol.XVIII (1796) p.281.

117. Graham P. (1812) op.cit. p.157.

118. Ibid.

119. Ibid.

120. N.S.A. Vol.VIII (1845) Baldernock p.172; Buchanan p.97; Killearn p.69.

121. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

122. Parliamentary Papers 1866 (3727)LX 1; 1874 c1033 LXIX 627.

123. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

Rye

1. Sinclair J. (1814) op.cit. Vol.I pp.482-3; 486.

2. Sinclair J. (1813) op.cit. Vol.I p.309.

3. Ibid. p.310; Sinclair J. (1814) Vol.I p.482.

4. Sinclair J. (1814) op.cit. Vol.I p.484.

5. Ibid. p.485.

6. Sinclair J. (1813) op.cit. Vol.I p.310; Sinclair J. (1814) op.cit. Vol.I p.483; rye was the most valuable crop on the Galloway moors.

7. Sinclair J. (1814) op.cit. Vol.I p.484; Smith J. (1813) op.cit. p.99.

8. Macdonald J. (1811) op.cit. p.196; Walker J. An Economical History of The Hebrides and Highlands of Scotland (1808) p.218.

9. Macdonald J. (1811) op.cit. p.196.

10. Ibid.

11. O.S.A. Vol.III (1792) p.364.

12. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

13. June Returns (1870) Argyllshire S.R.O. AF 39/2/1.
14. Aiton W. (1811) op.cit. p.261.
15. O.S.A. Ochiltree Vol.V (1793) p.447; Newton-upon-Ayr Vol.II (1792) p.265.
16. O.S.A. Girvan Vol.XII (1794) p.341.
17. O.S.A. Monkton & Prestwick Vol.XII (1794) p.398.
18. O.S.A. Muirkirk Vol.VII (1793) p.604.
19. O.S.A. Colmonell Vol.II (1792) p.62.
20. N.S.A. Vol.V (1845) West Kilbride p.262; Stevenston p.463.
21. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
22. Parliamentary Papers 1866 (3727)LX 1; Sturrock A. (1866-7) op.cit. p.51.
23. Sturrock A.(1866-7) op.cit. p.51.
24. June Returns 1870 (Ayrshire) S.R.O. AF 39/3/1.
25. Aiton W.(1816) op.cit. p.188.
26. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
27. June Returns 1870 (Buteshire) S.R.O. AF 39/6.
28. Ure D. (1794) op.cit. p.50; Highland & Agricultural Society Census 1854 p.6.
29. Highland & Agricultural Society Census 1856 p.9; Parliamentary Papers 1866 (3727) LX 1; 1872 c675 LXIII 675.
30. June Returns 1870 (Dumbartonshire) S.R.O. AF 39/10/1.
31. Naismith J. (1813) op.cit. p.115.
32. Ibid. p.116.
33. N.S.A. Vol.VI (1845) Dalserf p.743.
34. N.S.A. Vol.VI (1845) Hamilton p.280.
35. Highland & Agricultural Society Census 1854 p.5; 1855 p.5; 1856 p.9; 1857 p.7.
36. June Returns 1870 (Lanarkshire) S.R.O. AF 39/20/1.
37. O.S.A. Paisley Abbey Vol.VII (1793) p.85.
38. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7. Parliamentary Papers 1874 c1033 LXIX 627.
39. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.
40. O.S.A. Kilsyth Vol.VIII (1793) p.281.
41. Graham P. (1812) op.cit. p.155.
42. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

43. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

44. Handley J. Scottish Farming in the Eighteenth Century (1953) p.206.

45. Nevertheless bread of rye and wheat mixed was eaten in Northern England (Masslejohn, Masslem) Sinclair J. (1814) op.cit. Vol.I p.482. Large quantities of rye were imported to Scotland from the Baltic in times of dearth. Whyte I.D. (1974) op.cit. p.146.

46. N.S.A. Vol.VI (1845) Dalserf p.743.

47. McDonald J. (1811) op.cit. p.196.
In the Hebrides people had discontinued its growth for this reason.

48. Handley J. (1953) op.cit. p.55; Sinclair J. (1814) op.cit. Vol.I p.482.

49. Poultry would not eat rye and would not go through it to other corn, so it was often used as a fence against poultry and sown in small amounts for this purpose. Sinclair J. (1814) op.cit. Vol.I p.483; Robertson G. General Report of the Agriculture of the County of Midlothian (1795) p.67. It may also have been grown on outside rigs because it was not prone to shaking. Keith G.S. General Report of the Agriculture of the County of Aberdeen (1811) p.307.

50. "Rye straw is longer, stronger and wears better than the straw of wheat. It is usually used for thatching, packing etc." Watson J.A.S. & More J. (1924) op.cit. p.182.

CHAPTER 5

Turnips

1. Sinclair J. (1814) Vol.I op.cit. p.552.
2. Ibid.
3. Kames,Lord (1815) op.cit. p.135.
4. Sinclair J. (1814) Vol.I op.cit. p.560.
5. Smith J. (1813) op.cit. p.110.
6. Sinclair J. (1814) Vol.I op.cit. p.554.
7. Ibid. Kames, Lord (1815) op.cit. p.135.
8. Kames, Lord (1815) op.cit. p.135.
9. Sinclair J. (1814) Vol.I op.cit. p.554.
10. Ibid. p.555.
11. Ibid. Kames, Lord (1815) op.cit. p.136.
12. Kames, Lord (1815) op.cit. p.136.
13. Sinclair J. (1814) Vol.I p.555.
14. Ibid. p.557.

15. Ibid. p.558.
16. Ibid. p.567.
17. Ibid. p.568.
18. Ibid. p.570.
19. Ibid. p.567-70. For this reason it was commonly grown on turnip farms.
20. Grant K.W. Peasant Life in Argyllshire in the End of the Eighteenth Century S.H.R. Vol.XVI (1919) p.150.
21. O.S.A. Ardnamurchan Vol.XX (1798) p.295.
22. O.S.A. Kilbrandon & Kilchatan Vol.XIV (1795) p.158; Lismore & Appin Vol.I (1791) p.489.
23. O.S.A. Inveraray Vol.V (1793) p.299; Kilmalie Vol.VIII (1793) p.424; Tiree Vol.X (1794) p.396.
24. O.S.A. Killean & Kilchenzie Vol.XIX (1797) p.630.
25. O.S.A. Kilcalmonell & Kilberry Vol.X (1794) p.61; Glenorchy & Inishail Vol.VIII (1793) p.337; Kilmadon Vol.IV (1792) p.339.
26. O.S.A. Kilcalmonell & Kilberry Vol.X (1794) p.61.
27. Robson J. (1794) op.cit. p.30.
28. Smith J. (1813) op.cit. p.107; 109.
29. Macdonald J. (1811) op.cit. p.217.
30. Smith J. (1813) op.cit. p.109.
31. Ibid. p.109-10.
32. Ibid. p.111.
33. N.S.A. Vol.VII (1845) Craignish p.56; Dunoon p.616; Glenorchy p.100; Kilmore p.528; S. Knapdale p.264; Morvern p.188; Southend p.432; Strachur p.106; Torosay p.290.
34. N.S.A. Vol.VII (1845) Ardchattan p.502.
35. N.S.A. Vol.VII (1845) Kilfinichen p.308; Kilmartin p.563.
36. N.S.A. Vol.VII (1845) Kilninian p.344.
37. Highland & Agricultural Society Census op.cit. 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
Parliamentary Papers 1866 (3727) LX 1.
38. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.
39. Aiton W. (1811) op.cit. p.273.
40. Fullarton W. (1793) op.cit. p.24.
41. Ibid.
42. O.S.A. Dalry Vol.XII (1794) p.96.
43. O.S.A. Craigie Vol.V (1793) p.371; Kirkmichael Vol.I (1791) p.55.
44. O.S.A. Galston Vol.II (1792) p.76.
45. O.S.A. Symington Vol.V (1793) p.398; Stair Vol.VI (1793) p.113; Kirkoswald Vol.X (1794) p.490.

46. O.S.A. Tarbolton Vol.XIX (1797) p.455; Dreghorn Vol.IV (1792) p.281.
47. O.S.A. Auchinleck Vol.II (1792) p.431; Stevenston Vol.VII (1793) p.30.
48. Aiton W.(1811) op.cit. p.273.
49. Ibid.
50. Ibid. p.274.
51. Ibid.
52. Ibid. p.276.
53. N.S.A. Vol.V (1845) Ballantrae pp.420-1.
54. N.S.A. Vol.V (1845) Coylton p.659-60; Dailly p.387; Stewarton p.734-5.
55. N.S.A. Vol.V (1845) Straiton p.341; Tarbolton p.759.
56. Highland & Agricultural Society Census op.cit. 1854 p.6; 1857 p.7.
57. Parliamentary Papers 1866 (3727)LX 1; 1871 c460 LXIX 271; 1872 c675 LXIII 675.
58. S.R.O. GD 64/3/68.
59. Sturrock A. (1866-7) op.cit. p.47.
60. Ibid. p.53.
61. Ibid.
62. Irving G.V.I. & Murray A. Vol.III (1864) op.cit. p.11.
63. June Returns 1870 (Ayrshire) S.R.O. AF 39/3/1.
64. Heron R. (1794) op.cit. p.56.
65. Macdonald J. (1811) op.cit. p.217.
66. Aiton W. (1816) op.cit. p.191.
67. N.S.A. Vol.V (1845) Kingarth p.91; Rothesay p.108.
68. N.S.A. Vol.V (1845) Kilbride p.31; Kilmorie p.61.
69. Highland & Agricultural Society Census op.cit. 1854 p.6; 1855 p.5.
70. Ibid.
71. Parliamentary Papers 1866 (3727) LX 1; 1871 c460 LXIX 271.
72. June Returns 1870 (Buteshire) S.R.O. AF 39/6.
73. Ure D. (1794) op.cit. p.51.
74. Ibid. p.52.
75. O.S.A. Bonhill Vol.III (1792) p.450; Cardross Vol.XVII (1796) p.210; Kirkintilloch Vol.II (1792) p.278.
76. O.S.A. New Kilpatrick Vol.VII (1793) p.101; Cumbernauld Vol.VI (1793) p.463.
77. Whyte A. & Macfarlan D. (1811) op.cit. p.110; p.117.

78. Ibid. p.113.
79. Ibid. p.114.
80. Ibid.
81. Ibid. p.115.
82. N.S.A. Vol.VIII (1845) Cumbernauld p.149.
83. N.S.A. Vol.VIII (1845) Old Kilpatrick p.25; New Kilpatrick p.58.
84. N.S.A. Vol.VIII (1845) New Kilpatrick p.55.
85. Highland & Agricultural Society Census op.cit. 1854 p.6.
86. Parliamentary Papers 1866 (3727)LX 1.
87. June Returns 1870 (Dunbartonshire) S.R.O. AF 39/10/1.
88. Naismith J. (1794) op.cit. p.62.
89. Ibid. p.59.
90. Ibid.
91. O.S.A. Walston Vol.VII (1793) p.119; Carmichael Vol.XIII (1794) p.368; Lanark Vol.XV (1795) p.17; E. Monkland Vol.VII (1793) p.271; Pettinain Vol.XII (1794) p.33; Crawford Vol.IV (1792) p.508.
92. O.S.A. Stonehouse Vol.II (1792) p.224; Carnwath Vol.X (1794) p.327.
93. O.S.A. Carnworth Vol.X (1794) p.327.
94. O.S.A. Lesmahagow Vol.VII (1793) p.429; Dolphinton Vol.XIV (1795) p.109.
95. O.S.A. Dunsyre Vol.I (1791) p.340; Hamilton Vol.II (1792) p.189.
96. O.S.A. Lamington Vol.VI (1793) p.554.
97. S.R.O. GD 1/305/1.
98. Naismith J. (1813) op.cit. p.115.
99. N.S.A. Vol.VI (1845) Pettinain p.542. Turnips were also grown in Stonehouse p.473; Old Monkland p.656; Wandell p.828; Lanark p.21; Carnwath p.85; Carstairs p.559; Dunsyre p.72.
100. N.S.A. Vol.VI (1845) Pettinain p.543.
101. N.S.A. Vol.VI (1845) Avondale p.307.
102. N.S.A. Vol.VI (1845) Cadder p.410; Biggar p.366.
103. N.S.A. Vol.VI (1845) Govan p.695; Crawfordjohn p.516.
104. Highland & Agricultural Society Census op.cit. 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7. Parliamentary Papers 1866 (3727)LX 1; 1874 c1033 LXIX 627.
105. June Returns 1870 (Lanarkshire) S.R.O. AF 39/20/1.

106. Martin A. (1794) op.cit. p.8; p.9; p.15; p.16.

107. Ibid.

108. Ibid. p.18.

109. O.S.A. Erskine Vol.IX (1793) p.64.

110. Ibid.

111. O.S.A. Paisley Abbey Vol.VII (1793) p.85;
Mearns Vol.XVII (1796) p.306.

112. Wilson J. (1812) op.cit. p.100.

113. Ibid.

114. Ibid.

115. N.S.A. Vol.VII (1845) Mearns p.523.

116. N.S.A. Vol.VII (1845) Erskine p.518*; Paisley p.259.

117. Highland & Agricultural Society Census 1854 p.6;
1855 p.5; 1856 p.9; 1857 p.7.
Parliamentary Papers 1866 (3727)LX 1.

118. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.

119. Belsches R.(1796) op.cit. p.33.

120. Ibid.

121. O.S.A. Baldernock Vol.XV (1795) p.276; Kippen Vol.XVIII
(1796) p.349; Gargunnock Vol.XVIII (1796) p.106.

122. O.S.A. Campsie Vol.XV (1795) p.341.

123. O.S.A. Buchanon Vol.IX (1793) p.18.

124. O.S.A. Strathblane Vol.XVIII (1796) p.568;
Killearn XVI (1795) p.114.

125. O.S.A. Fintry Vol.XI (1794) p.373.

126. Graham P. (1812) op.cit. p.163.

127. Ibid. p.164.

128. Ibid. p.165-6.

129. Ibid. p.166.

130. Ibid.

131. Ibid. p.166-7.

132. N.S.A. Vol.VIII (1845) Alva p.186; Baldernock p.172;
Buchanan p.97; Campsie p.250; Dunipace p.383; Killearn p.69;
Logie p.230; Polmont p.197; St Ninians p.327;
Slamannan p.277; Stirling p.429; Strathblane p. 85.

133. N.S.A. Vol.VIII (1845) Logie p.230; Stirling p.429;
St Ninians p.327.

134. N.S.A. Vol.VIII (1845) Baldernock p.172; Polmont p.197.

135. Highland & Agricultural Society Census 1854 p.6;
1855 p.5; 1856 p.9; 1857 p.7.

136. Parliamentary Papers 1866 (3727) [illegible]

137. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

138. Orwin C.S. & Whetham E. A History of British Agriculture 1846-1914 (1964) p.136

139. Ernle Lord. 6th Edition (1961) op.cit. p.371; Orwin C.S. & Whetham E. (1964) op.cit. p.30; Symon J.A. Scottish Farming & Past and Present (1959) p.178; Watson J.A.S. & More J. (1924) op.cit. p.231.

140. Watson J.A.S. & More J.A. (1924) op.cit. p.207

141. Ibid.

Potatoes

1. Watson J.A.S. & More J.A. (1944) op.cit. p.232, Sinclair J. (1814) op.cit. Vol.I. p.576.
2. Sinclair J. (1813) op.cit. Vol.I. p.295; (1814) op.cit. Vol.I. p.571.
3. Ibid. (1814) p.572.
4. Ibid.
5. Ibid.
6. Ibid.
7. Ibid. p.573.
8. Sinclair J. (1813) op.cit. Vol.I. p.290.
9. Sinclair J. (1814) op.cit. Vol.I. p.573.
10. Kames, Lord (1815) op.cit. p.140.
11. Ibid. p.140-141.
12. Ibid. p.141; Sinclair J. (1814) op.cit. Vol I.p.573-4.
13. Sinclair J. (1814) op.cit. Vol.I. p.573.
14. Kames, Lord (1815) op.cit. p.141.
15. Sinclair J. (1814) op.cit. Vol.I. p.574.
16. Grant K.W. (1919) op.cit. p.150; Robson J. (1794) op.cit. p.24.
17. Robson J. (1794) op.cit. p.24; p.26.
18. Ibid. p.19.
19. Ibid. p.55.
20. O.S.A. Dunoon Vol.II (1792) p.392.
21. O.S.A. They were raised in Gigha & Cara Vol.VIII (1793) p.49; Inveraray Vol.V (1793) p.299; Kilcalmonell Vol.X (1794) p.61; Inverchaolain Vol.V (1793) p.466; Southend Vol.III (1792) p.364; Kilchonan Vol.XI (1794) p.277; Kildalton Vol.XI (1794) p.286; N. Knapdale Vol.VI (1793) p.263; S. Knapdale Vol.XIX (1797) p.320; Lismore & Appin Vol.I (1791) p.489; (Continued)

21. (Continued)
Strachur Vol.IV (1792) p.565; Kilbrandon Vol.XIV (1795) p.158; Glenorchy Vol.VIII (1793) p. ; Kilfinichen Vol.XIV (1795) p.192; Kilmore Vol.XI (1794) p.124; Kilmartin Vol.VIII (1793) p.99; Kilmalie Vol.VIII (1793) p.424; Kilmaden Vol.IV (1792) p.339; Campbeltown Vol.X (1794) p.549; Kilfinan Vol.XIV (1795) p.243; Jura Vol.XII (1794) p.320; Ardchattan Vol.VI (1793)p.176. They were an important support of the people in Glassary Vol.VIII (1794) p.655; S. Knapdale Vol.XIX (1797) p.320; Glenorchy Vol.VIII (1793) p.338.

22. O.S.A. Campbeltown Vol.X (1794) p.549.

23. O.S.A. Inverchaolain Vol.V (1793) p.466; Craignish Vol.VII (1793) p.441.

24. O.S.A. Morvern Vol.X (1794) p.265.

25. O.S.A. Kilninian Vol.XIV (1795) p.141.

26. O.S.A. Kilmalie Vol.VIII (1793) p.424; Tiree Vol.X (1794) p.396.

27. Smith J. (1813) op.cit. p.92.

28. Ibid. p.94.

29. Ibid.

30. Ibid. p.95.

31. Ibid. p.96.

32. Ibid.

33. Ibid. p.95.

34. N.S.A. Vol.VII (1845) Ardnamurchan p.151.

35. N.S.A. Vol.VII (1845) Gigha & Cara p.403.

36. N.S.A. Vol.VII (1845) Kilcalmonell p.410.

37. Gray M. The Highland Potato Famine of the 1840's E.H.R. Vol.7 1954-5 p.361-363.

38. Macnab P.A. The Isle of Mull (1970) p.86.

39. Highland & Agricultural Society Census op.cit. 1854 p.6

40. Parliamentary Papers 1866 (3727)LX 1; 1869 (4200)LXII 507.

41. Parliamentary Papers 1870 c223 LXVIII 363.

42. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.

43. Sturrock A. (1866-7) op.cit. p.30;
Fullarton W. (1793) op.cit. p.25.

44. Ibid. p.26.

45. O.S.A. Colmonell Vol.II (1792) p.62.

46. Ibid.

47. O.S.A. Kilmarnock Vol.II (1792) p.103.

48. O.S.A. Ballantrae Vol.I (1791) p.107; Craigie Vol.V (1793) p.371; Fenwick Vol.XIV (1795) p.55; Kilmaurs Vol.IX (1793) p.360; Kirkoswald Vol.X (1794) p.490; Monkton Vol.XII (1794) p.400; Sorn Vol.XX (1798) p.150-1; Symington Vol.V (1793) p.398.
49. O.S.A. Sorn Vol.XX (1798) p.151.
50. O.S.A. Galston Vol.II (1792) p.75.
51. O.S.A. Dalry Vol.XII (1794) p.96.
52. O.S.A. Kilwinning Vol.XI (1794) p.154.
53. Aiton W. (1811) op.cit. p.277.
54. Ibid. p.278.
55. Ibid.
56. Ibid. p.280.
57. Ibid. p.281.
58. Ibid.
59. Sturrock A. (1866-7) op.cit. p.30.
60. Ibid.
61. Ibid. p.30.
62. Ibid. p.31.
63. N.S.A. Vol.V (1845) Auckinleck p.326; Dailly p.387.
64. N.S.A. Vol.V (1845) Dunlop p.299; Stair p.646; Monkton p.175; Stewarton p.734.
65. Highland & Agricultural Society Census op.cit. 1854 p.6.
66. Sturrock A. (1866-7) op.cit. p.30.
67. Parliamentary Papers 1866 (3727)LX 1; 1870 c223 LXVIII 363.
68. June Returns 1870 (Ayrshire) S.R.O. AF 39/3/1.
69. Heron R. (1794) op.cit. p.55-56.
70. O.S.A. Kingarth Vol.I (1791) p.309; Kilbride Vol.VIII (1793) p.578.
71. O.S.A. Kilmorie Vol.IX (1793) p.170.
72. Macdonald J. (1811) op.cit. p.232.
73. Aiton W. (1816) op.cit. p.192.
74. Ibid.
75. N.S.A. Vol.V (1845) Kilbride p.30-1; Kilmorie p.61; Kingarth p.91; Rothesay p.108.
76. Highland & Agricultural Society Census op.cit. 1854 p.6. Parliamentary Papers 1871 c460 LXIX 271.
77. June Returns 1870 (Buteshire) S.R.O. AF 39/6.

78. Ure D. (1794) op.cit. p.52. They were grown in Bonhill O.S.A. Vol.III (1792) p.450; Cardross Vol.XVII (1796) p.210; Cumbernauld Vol.VI (1793) p.463; New Kilpatrick Vol.VII (1793) p.101; Old Kilpatrick Vol.V (1793) p.233.

79. Ure D. (1794) op.cit. p.52.

80. Ibid.

81. O.S.A. Old Kilpatrick Vol.V (1793) p.233. E.g. Cardross Vol.XVII (1796) p.210; Kirkintilloch Vol.II (1792) p.278; Cumbernauld Vol.VI (1793) p.463.

82. Whyte A. & Macfarlan D. (1811) op.cit. p.119.

83. Ibid.

84. Ibid. p.120-1.

85. Ibid. p.128.

86. Ibid. p.130.

87. Ibid.

88. N.S.A. Vol.VIII (1845) New Kilpatrick p.55; Kirkintilloch p.197; Cumbernauld p.149.

89. N.S.A. Vol.VIII (1845) Cumbernauld p.149.

90. Highland & Agricultural Society Census op.cit. 1854 p.6.

91. Ibid. 1855 p.5; 1856 p.9; 1857 p.7.

92. Parliamentary Papers 1866 (3727)LX 1; 1871 c460 LXIX 271.

93. June Returns 1870 (Dumbartonshire) S.R.O. AF 39/10/1.

94. O.S.A. Dalserf Vol.II (1792) p.377-8.

95. O.S.A. Hamilton Vol.II (1792) p.187.

96. O.S.A. Bothwell Vol.XVI (1795) p.311.

97. O.S.A. Carnwath Vol.X (1794) p.329.

98. Ibid.

99. O.S.A. Pettinain Vol.XII (1794) p.34.

100. Ibid.

101. O.S.A. East Monkland Vol.VII (1793) p.271.

102. O.S.A. Blantyre Vol.II (1792) p.218.

103. They were mentioned in Avondale Vol.IX (1793) p.384; Blantyre Vol.II (1792) p.218; Cadder Vol.VIII (1793) p.476; Cambuslang Vol.V (1793) p.247; Covington Vol.I (1791) p.190; Culter Vol.VI (1793) p.76; Dolphinton Vol.IX (1793) p.109; Douglas Vol.VIII (1793) p.79; Dunsyre Vol.I (1791) p.340; Govan Vol.XIV (1795) p.287; Lanark Vol.XV (1795) p.18; Libberton Vol.II (1792) p.239; Rutherglen Vol.IX (1793) p.2; Stonehouse Vol.II (1792) p.224; Walston Vol.VII (1793) p.119.

104. Potatoes were grown in the following parishes as well as those listed below N.S.A. Vol.VI (1845) Carnwath p.85; Carstairs p.559; Dalserf p.742; Douglas p.486; Glassford p.299; Lanark p.21; Pettinain p.542; Stonehouse p.473; Wandell p.828.

105. N.S.A. Vol.VI (1845) Govan p.695.

106. N.S.A. Vol.VI (1845) Old Monkland p.656.

107. N.S.A. Vol.VI (1845) Carstairs p.557.

108. N.S.A. Vol.VI (1845) Hamilton p.280.

109. N.S.A. Vol.VI (1845) Stonehouse p.473; Avondale p.307.

110. Highland & Agricultural Society Census op.cit. 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

111. Parliamentary Papers 1866 (3727)LX 1; 1871 c460 LXIX 271.

112. Ibid. 1872 c675 LXIII 675; 1873 c878 LXIX 301; 1874 c1033 LXIX 627.

113. June Returns 1870 (Lanarkshire) S.R.O. AF 39/20/1.

114. Wilson J. (1812) op.cit. p.101.

115. Ibid. p.102.

116. Martin A. (1794) op.cit. p.9; p.12.

117. O.S.A. Lochwinnoch Vol.XV (1795) p.73; Kilbarchan Vol.XV (1795) 499-500.

118. O.S.A. Cathcart Vol.V (1793) p.342; Wilson J. (1812) op.cit. p.102.

119. O.S.A. Cathcart Vol.V (1793) p.342.

120. O.S.A. Mearns Vol.XVII (1796) p.306; Houston & Killallen Vol.I (1791) p.323; Renfrew Vol.II (1792) p.173; Paisley Abbey Vol.VII (1793) p.85.

121. O.S.A. Erskine Vol.IX (1793) p.63.

122. Wilson J. (1812) op.cit. p.102.

123. Ibid.

124. N.S.A. Vol.VII (1845) Cathcart p.597; Eastwood p.39; Erskine p.518*, Mearns p.523; Paisley p,259.

125. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

126. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.

127. Belsches R.(1796) op.cit. p.31; O.S.A. Kilsyth Vol.XVIII (1796) p.282.

128. Belsches R. (1796) op.cit. p.32.

129. Ibid.

130. O.S.A. Fintry Vol.II (1792) p.374; Kippen Vol.XVIII (1796) p.345.

131. O.S.A. Denny Vol.II (1792) p.421; Alva Vol.XVIII (1796) p.130; Airth Vol.III (1792) p.490; Bothkennar Vol.XVII (1796) p.301.

132. O.S.A. Kilsyth Vol.XVIII (1796) p.282; Buchanan Vol.IX (1793) p.18.

133. O.S.A. Gargunnock Vol.XVIII (1796) p.107.

134. O.S.A. Baldernock Vol.XV (1795) p.276.

135. Graham P. (1812) op.cit. p.170-2.

136. Ibid. p.173.

137. Ibid.

138. Ibid.

139. Ibid. p.174 & 178.

140. N.S.A. Vol.VIII (1845) Alva p.185; Campsie p.250; Dunipace p.383; Logie p.230.

141. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
Parliamentary Papers 1870 c223 LXVIII 363.

142. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

143. Mitchison R. A History of Scotland (1870)
Mathias P. The First Industrial Nation. An Economic History of Britain, 1700-1914 p.64.
Sturrock A. (1866-7) op.cit. "Their cultivation may be said to have reached its height between 1835 and 1845 ... But nearly all this was done away with after the almost total destruction of the potato crops in 1845-46."
Taylor wrote of the calamitous and almost total failure of the potato crop in Fenwick in October 1845 and expressed anxiety about the provision of food. By August 1846 things were worse so the whole crop had failed. Taylor J. (Ed) Annals of Fenwick 1970.
The potato crop was damaged in all counties in 1846, and the failure was more severe than in the previous year. There was privation in many villages.
Continuation of Reports on the Disease of the Potato Crop in Scotland for the year 1846. T.H.A.S. 1847-9 X p.83-127.

144. Parliamentary Papers 1873 c878 LXIX 301 p.10.

145. "Many farmers in suitable areas probably make more profit from potatoes than from any other farm crop."
Watson J.A.S. & More J.A. (1944) op.cit. p.233.

146. "Its bulky nature makes it not only costly but difficult to market, and for this reason, even where the soil is suitable very few potatoes are grown at any great distance from market centres." Ibid. p.233.

Carrots

1. Sinclair J. (1814) op.cit. Vol.I p.579.
2. Ibid. p.580.
3. Ibid.
4. Ibid.
5. Ibid. p.581.
6. Aiton W. (1811) op.cit. p.276-7.
7. N.S.A. Vol.V (1845) Tarbolton p.759; Dalrymple p.283.
8. Whyte A. & Macfarlan D. (1811) op.cit. p.118.
9. Naismith J. (1813) op.cit. p.115.
10. N.S.A. Vol.VI (1845) Pettinain p.543.
11. Wilson J. (1812) op.cit. p.107.
12. Watson J.A. & More J.A. (1924) op.cit. p.227.
13. Graham P. (1812) op.cit. p.168.
14. Ibid.
15. Ibid. p.169.
16. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7. Parliamentary Papers 1866-74.
17. June Returns 1870 S.R.O. Argyllshire AF 39/2/1; Ayrshire AF 39/3/1; Buteshire AF 39/6; Dunbartonshire AF 39/10/1; Lanarkshire AF 39/20/1; Renfrewshire AF 39/26/1; Stirlingshire AF 39/30/1.
18. Sturrock A. (1877-7) op.cit. p.56.
19. Watson J.A.S. & More J.A. (1924) op.cit. p.227; Sturrock A. (1866-67) op.cit. p.56.
20. Sturrock A. (1866-7) p.56.
21. Ibid. p.56.
22. Report on the Present State of Agriculture of Scotland H.A.S.S. (1878) p.74.

CHAPTER 6

Cabbages

1. Sinclair J. (1814) op.cit. Vol.I p.596.
2. Ibid.
3. Watson J.A.S. & More J.A. (1924) op.cit. p.249.
4. Ibid.
5. Smith J. (1813) op.cit. p.112.
6. Ibid. p.113.

7. O.S.A. Kilcalmonell & Kilberry Vol.X (1794) p.67.
8. Aiton W. (1811) op.cit. p.275.
9. N.S.A. Vol.V (1845) Dalrymple p.283.
10. Whyte A. & Macfarlan D. (1811) op.cit. p.116.
11. Naismith J. (1813) op.cit. p.116; Wilson J. (1812) op.cit. p.107; Graham P. (1812) op.cit. p.167 N.S.A. Vol.VIII (1845) p.277 - Cabbages extensively grown, but produce irregular.
12. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
13. Parliamentary Papers 1866-74.
14. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.
15. Ibid. 1870 (Ayrshire) S.R.O. AF 39/3/1.
16. Sturrock A. (1866-7) op.cit. p.54.
17. June Returns 1870 (Buteshire) S.R.O. AF 39/6.
18. Ibid. 1870 (Dunbartonshire) S.R.O. AF 39/10/1; (Renfrewshire) S.R.O. AF 39/26/1.
19. Ibid. 1870 (Lanarkshire) S.R.O. AF 39/20/1.
20. Ibid. 1870 (Stirlingshire) S.R.O. AF 39/30/1.

Flax

1. Sinclair J. (1814) op.cit. Vol.I p.582.
2. Turner W.H.K. Flax Cultivation in Scotland : an historical geography T.I.B.G. Mar 1972 Vol.55 pp.127-143.
3. Sinclair J. (1814) op.cit. Vol.I p.583.
4. Ibid.
5. Ibid. p.584.
6. Ibid.
7. Turner W.H.K. (1972) op.cit. pp.132-3.
8. Ibid.
9. Smith J. (1813) op.cit. p.99.
10. Ibid. p.100.
11. Ibid.
12. Ibid.
13. For example it was mentioned in Ardnamurchan O.S.A. Vol.XX (1798) p.295; Kilbrandon Vol.XIV (1795) p.158; Kilcalmonell Vol.X (1794) p.64; Killean Vol.XIX (1797) p.629; Jura Vol.XII (1794) p.320; Kildalton Vol.XI (1794) p.288.
14. O.S.A. Lismore Vol.I (1791) p.489; Kilfinan Vol.XIV (1795) p.242.

15. O.S.A. Kilmalie Vol.VIII (1793) p.425; Gigha & Cara Vol.VIII (1793) p.49; Campbeltown Vol.X (1794) p.549.
16. O.S.A. Kilarrow & Kilmenny Vol.XI (1794) p.300.
17. O.S.A. Kilchonan Vol.XI (1794) p.277.
18. N.S.A. Vol.VII (1845) Craignish p.56; Tiree p.216.
19. For example it was mentioned in Ayr Vol.I (1791) p.92; Dalry Vol.XII (1794) p.96; Kirkmichael Vol.VI (1793) p.103-4; Kilmaurs Vol.IX (1793) p.360; Symington Vol.V (1793) p.398; Dailly Vol.X (1794) p.42; Sorn Vol.XX (1798) p.152; Fenwick Vol.XIV (1795) p.55; Dalrymple Vol.IV (1792) p.306.
20. O.S.A. Beith Vol.VIII (1793) p.319; West Kilbride Vol.XII (1794) p.409.
21. O.S.A. Old Cumnock Vol.VI (1793) p.413.
22. O.S.A. Galston Vol.II (1792) p.76.
23. O.S.A. Kirkoswald Vol.X (1794) p.490.
24. N.S.A. Vol.V (1845) Stevenston p.463; Dalrymple p.283; Largs p.802.
25. S.R.O. GD 21/229.
26. Sturrock A. (1866-7) op.cit. p.57.
27. Ibid.
28. Ibid.
29. Ibid.
30. Ibid.
31. Heron R. (1794) op.cit. p.55.
32. O.S.A. Kilmorie Vol.IX (1793) p.170.
33. N.S.A. Vol.V (1845) Kilbride p.31.
34. Highland & Agricultural Society Census 1854 p.6.
35. Ibid. 1855 p.5; 1856 p.9; 1857 p.7.
36. Parliamentary Papers 1866-1874.
37. Ure D. (1794) op.cit. p.53.
38. Ibid.
39. Ibid. p.54.
40. O.S.A. Bonhil Vol.III (1792) p.450; Kirkintilloch Vol.II (1792) p.278; New Kilpatrick Vol.VII (1793) p.101; Luss Vol.XVII (1796) p.259; Cumbernauld Vol.VI (1793)p.463.
41. Whyte A. & Macfarlan D. (1811) op.cit. p.135.
42. Ibid. p.137.
43. N.S.A. Vol.VIII (1845) Kirkintilloch p.197; Cumbernauld p.150.
44. N.S.A. Vol.VIII (1845) Kirkintilloch p.197.

45. N.S.A. Vol.VIII (1845) Cumbernauld p.150.

46. Naismith J. (1794) op.cit. p.62.

47. For example flax was mentioned in O.S.A. Culter Vol.VI (1793) p.96; Dalserf Vol.II (1792) p.378; Hamilton Vol.II (1793) p.190; Bothwell Vol.XVI (1795) p.311; Blantyre Vol.II (1792) p.218; Avondale Vol.IX (1793) p.387; Crawford Vol.IV (1792) p.508; Crawfordjohn Vol.VI (1793) p.275; Lesmahagow Vol.VII (1793) p.428; Shotts Vol.XV (1795) p.51; Pettinain Vol.XII (1794) p.34; Lamington Vol.VI (1793) p.555; Carnwath VolX (1794) p.329; West Monkland Vol.VII (1793) p.381.

48. O.S.A. West Monkland Vol.VII (1793) p.381.

49. O.S.A. East Monkland Vol.VII (1793) p.270.

50. O.S.A. Culter Vol.VI (1793) p.77.

51. O.S.A. Stonehouse Vol.II (1792) p.224.

52. N.S.A. Vol.VI (1845) Dalserf p.743.

53. N.S.A. Vol.VI (1845) Stonehouse p.473. Its general use must have been before the 1790s.

54. N.S.A. Vol.VI (1845) Old Monkland p.657; New Monkland p.246.

55. N.L.S. Ms 5329/171; S.R.O. GD 1/28/102.

56. O.S.A. Erskine Vol.IX (1793) p.67; Paisley Abbey Vol.VII (1793) p.185; Lochwinnoch Vol.XV (1795) p.73.

57. Wilson J. (1812) op.cit. p.107.

58. Belsches R. (1796) op.cit. p.32.

59. For example O.S.A. Killearn Vol.XVI (1795) p.114; Kippen Vol.XVIII (1796) p.345; Denny Vol.II (1792) p.421; Kilsyth Vol. XVIII (1796) p.282; Buchanan Vol.IX (1793) p.18.

60. O.S.A. Fintry Vol.XI (1794) p.374.

61. O.S.A. Slamannan Vol.XIV (1795) p.83; Larbert Vol.III (1792) p.335.

62. Graham P. (1812) op.cit. p.183.

63. N.S.A. Vol.VIII (1845) Denny p.126; Dunipace p.383.

64. N.S.A. Vol.VIII (1845) Slamannan p.277.

65. Highland & Agricultural Society Census op.cit. 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

66. Parliamentary Papers 1866 (3727)LX 1.

67. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.

68. Ibid. (Ayrshire) S.R.O. AF 39/3/1.

69. Ibid. (Buteshire) S.R.O. AF 39/6; (Dunbartonshire) S.R.O. AF 39/10/1.

70. Ibid. (Lanarkshire) S.R.O. AF 39/20/1.

71. Ibid. (Renfrewshire) S.R.O. AF 39/26/1.
72. Ibid. (Stirlingshire) S.R.O. AF 39/30/1.
73. Turner W.H.K. (1972) op.cit. p.137.
74. Watson J.A.S. & More J.A. (1944) op.cit. p.765.
75. Turner W.H.K. (1972) op.cit. p.137.
76. Ibid.
77. Ibid. p.138.
78. Ibid.
79. Ibid. pp.138-9.
80. Ibid.

Legumes

1. Watson J.A.S. & More J.A. (1924) op.cit. p.26-27.
2. Slicher Van Bath B.H. The Agrarian History of Western Europe AD 500 - 1850 (1963) p.279; Whyte I.D. (1974) op.cit. p.148.
3. Graham P. (1812) op.cit. p.159.
4. Sinclair J. (1814) op.cit. Vol.I p.516; Kames, Lord (1815) op.cit. p.128.
5. Sinclair J. (1814) op.cit. Vol.I p.515; Kames, Lord (1815) op.cit. p.130 - Sand or gravel thought unsuitable for beans.
6. Sinclair J. (1814) op.cit. Vol.I p.516. When sown broadcast the plants grew high but were unable to ripen properly and produced little seed; Kames, Lord (1815) op.cit. p.131.
7. Sinclair J. (1814) op.cit. Vol.I p.522.
8. Watson J.A.S. & More J.A. (1944) op.cit. p.314-315.
9. Sinclair J. (1814) op.cit. Vol.I p.515-6.
10. Ibid. p.518; (1813) op.cit. Vol.I p.271.
11. Sinclair J. (1814) op.cit. Vol.I p.517; Kames, Lord (1815) op.cit. p.129.
12. Sinclair J. (1814) op.cit. Vol.I p.520.
13. Cleon pease - peas alone. Sinclair J. (1813) op.cit. Vol.I p.270.
14. Sinclair J. (1814) op.cit. Vol.I p.527.
15. Sinclair J. (1813) op.cit. Vol.I p.270. Kames, Lord (1815) op.cit. p.132. For this reason Kames felt that they must eventually be superceded in the moist British climate.
16. Sinclair J. (1813) op.cit. Vol.I p.270.
17. Ibid.
18. Sinclair J. (1814) op.cit. Vol.I p.527.
19. Kames, Lord (1815) op.cit. p.133.

20. Ibid. p.131.
21. Ibid. p.131; Sinclair J. (1814) op.cit. Vol.I p.527.
22. Kames, Lord (1815) op.cit. p.132; Sinclair J. (1814) op.cit. Vol.I p.527-530.
23. Kames, Lord (1815) op.cit. p.134.
24. Sinclair J. (1814) op.cit. Vol.I p.531.
25. Robson J. (1794) op.cit. p.18; p.24; p.26; p.30; p.56.
26. Macdonald J. (1811) op.cit. p.215.
27. O.S.A. Kilmadan Vol.IV (1792) p.339; Saddel & Skipness Vol.XII (1794) p.476.
28. O.S.A. Muckairn Vol.VI (1793) p.176; Kilfinan Vol.XIV (1795) p.238; Ardnamurchan Vol.XX (1798) p.295; Campbeltown Vol.X (1794) p.549.
29. O.S.A. Kilcalmonell & Kilberry Vol.X (1794) p.67.
30. O.S.A. Killean & Kilchenzie Vol.XIX (1797) p.630.
31. O.S.A. Jura & Colonsay Vol.XII (1794) p.321; Tiree Vol.X (1794) p.396; Kilbrandon & Kilchattan Vol.XIV (1795) p.158.
32. Smith J. (1813) op.cit. p.98.
33. Ibid.
34. Ibid. p.99
35. Ibid.
36. N.S.A. Vol.VII (1845) Kilchonan p.655; Killean p.388; South Knapdale p.264.
37. N.S.A. Vol.VII (1845) Southend p.433.
38. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.
39. Parliamentary Papers 1866 (3727)LX 1.
40. June Returns 1870 (Argyllshire) S.R.O. AF 39/2/1.
41. Fullarton W. (1793) op.cit. p.24; Aiton W. (1811) op.cit. p.272.
42. Fullarton W. (1793) op.cit. p.24.
43. Ibid.
44. O.S.A. Colmonell Vol.II (1792) p.62; Kilmarnock Vol.II (1792) p.102.
45. O.S.A. Kilmarnock Vol.II (1792) p.102.
46. O.S.A. Ballantrae Vol.I (1791) p.107; Kirkmichael Vol.I (1791) p.55; Stair Vol.VI (1793) p.113; Kirkoswald Vol.X (1794) p.486.
47. O.S.A. Auckinleck Vol.XI (1794) p.431; Muirkirk Vol.VII (1793) p.604.
48. O.S.A. Dalry Vol.XII (1794) p.95.

49. O.S.A. Loudoun Vol.III (1792) p.107; Dailly Vol.X (1794) p.42.

50. O.S.A. Stevenston Vol.VII (1793) p.30; Girvan Vol.XII (1794) p.340; Dalry Vol.XII (1794) p.95.

51. O.S.A. Kirkoswald Vol.X (1794) p.490; Symington Vol.V (1793) p.398; Kilmaurs Vol.IX (1793) p.360; Riccarton Vol.VI (1793) p.120.

52. O.S.A. Galston Vol.II (1792) p.75.

53. O.S.A. West Kilbride Vol.XII (1794) p.409; Beith Vol.VIII (1793) p.315.

54. O.S.A. Craigie Vol.V (1793) p.371; Old Cumnock Vol.VI (1793) p.413.

55. Aiton W. (1811) op.cit. p.272.

56. Sinclair J. (1813) op.cit. Vol.I p.273.

57. Aiton W. (1811) op.cit. p.271.

58. N.S.A. Vol.V (1845) Auckinleck p.327.

59. N.S.A. Vol.V (1845) Craigie p.767; Kilbirnie p.713.

60. N.S.A. Vol.V (1845) Dalry p.232; Sorn p.138; Stevenston p.463; Kilmaurs p.771; Old Cumnock p.485; West Kilbride p.262; Dalrymple p.283.

61. N.S.A. Vol.V (1845) Kirkoswald p.785; Stair p.646.

62. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

63. Parliamentary Papers 1866 (3727)LX 1; 1868 (4057)LXX 125.

64. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

65. Parliamentary Papers 1866-1874.

66. June Returns 1870 (Ayrshire) S.R.O. AF 39/3/1.

67. Heron R. (1794) op.cit. p.55.

68. O.S.A. Kilmorie Vol.IV (1793) p.170.

69. Headrick J. (1807) op.cit. pp.331-333.

70. N.S.A. Vol.V (1845) Kilbride p.30, 31; Kilmorie p.61.

71. Highland & Agricultural Society Census 1854 p.6.

72. Ibid.

73. Ibid. 1857 p.7.

74. Parliamentary Papers 1866 (3727)LX 1.

75. June Returns 1870 (Buteshire) S.R.O. AF 39/6.

76. Ure D. (1794) op.cit. p.50.

77. O.S.A. Cumbernauld Vol.VI (1793) p.463; New Kilpatrick Vol.VII (1793) p.101; Kirkintilloch Vol.II (1792) p.278.

78. O.S.A. Bonhill Vol.III (1792) p.450; Old Kilpatrick Vol.V (1793) p.233; Rhu Vol.IV (1792) p.407.

79. O.S.A. Luss Vol.XVII (1796) p.259.

80. Whyte A. & Macfarlan D. (1811) op.cit. p.108.

81. Ibid.

82. Ibid. p.107.

83. Ibid.

84. Ibid. p.109.

85. N.S.A. Vol.VIII (1845) New Kilpatrick p.57.

86. N.S.A. Vol.VIII (1845) Kirkintilloch p.197.

87. Highland & Agricultural Society Census 1854 p.6; 1855 p.5.

88. Parliamentary Papers 1866 (3727)LX 1; 1873 c878 LXIX 301.

89. Ibid.

90. June Returns 1870 (Dunbartonshire) S.R.O. AF 39/10/1.

91. Naismith op.cit. (1794) p.62; (1798) p.86.

92. Ibid. (1794) p.62.

93. O.S.A. Dalserf Vol.II (1792) p.376.

94. O.S.A. Hamilton Vol.II (1792) p.185.

95. Ibid.

96. O.S.A. Bothwell Vol.XVI (1795) p.311.

97. O.S.A. Pettinain Vol.XII (1794) p.34.

98. O.S.A. Shotts Vol.XV (1795) p.51; Lesmahagow Vol.VII (1793) p.428.

99. O.S.A. Crawfordjohn Vol.VI (1793) p.275; Blantyre Vol.II (1792) p.218; Cambusnethan Vol.XII (1794) p.570; Carmunnock Vol.XVIII (1796) p.160; East Monkland Vol.VII (1793) p.270; West Monkland Vol.VII (1793) p.387; Rutherglen Vol.IX (1793) p.2; Cambuslang Vol.V (1793) p.247; Lamington Vol.VI (1793) p.554; Lanark Vol.XV (1795) p.17; Stonehouse Vol.II (1792) p.224; Avondale Vol.IX (1793) p.384; Crawford Vol.IV (1792)p.508.

100. O.S.A. Carnwath Vol.X (1794) p.328; Carmichael Vol.XIII (1794) p.368.

101. O.S.A. Govan Vol.XIV (1795) p.287.

102. O.S.A. Covington Vol.I (1791) p.190.

103. N.S.A. Vol.VI (1845) Dalziel p.456; Bothwell p.795; Old Monkland p.656; Hamilton p.279.

104. N.S.A. Vol.VI (1845) Cadder p.410; Lanark p.21; Biggar p.366; Carmichael p.530.

105. N.S.A. Vol.VI (1845) Cambuslang p.434.

106. Highland & Agricultural Society Census 1854 p.6; 1856 p.9.

107. Parliamentary Papers 1866 (3727)LX 1; 1868 (4057)LXX 125.
108. Highland & Agricultural Society Census 1854 p.6.
109. Ibid. 1857 p.7; Parliamentary Papers 1868 (4057)LXX 125.
110. Parliamentary Papers 1871 c460 LXIX 271; 1874 c1033 LXIX 627.
111. June Returns 1870 (Lanarkshire) S.R.O. AF 39/20/1.
112. Ibid.
113. Martin A. (1794) op.cit. p.8.
114. O.S.A. Houston & Kilallan Vol.I (1791) p.323.
115. O.S.A. Kilbarchan Vol.XV (1795) p.499.
116. O.S.A. Paisley Abbey Vol.VII (1793) p.85.
117. Wilson J. (1812) op.cit. p.100.
118. N.S.A. Vol.VII(1845) Mearns p.523.
119. N.S.A. Vol.VII(1845) Paisley p.259.
120. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1857 p.7.
121. Parliamentary Papers 1866 (3727)LX 1.
122. Highland & Agricultural Society Census 1854 p.6; Parliamentary Papers 1874 c1033 LXIX 627.
123. June Returns 1870 (Renfrewshire) S.R.O. AF 39/26/1.
124. Ibid.
125. Belsches R. (1796) op.cit. p.30.
126. Ibid.
127. Ibid.
128. Ibid.
129. Ibid. p.31.
130. O.S.A. Killean Vol.XVI (1795) p.114; Kippen Vol.XVIII (1796) p.345.
131. O.S.A. Alva Vol.XVIII (1796) p.130; Bothkennar Vol.XVII (1796) p.296; Airth Vol.III (1792) p.490; Strathblane Vol.XVIII (1796) p.567; Kilsyth Vol.XVIII(1796) p.281.
132. O.S.A. Campsie Vol.XV (1795) p.341.
133. O.S.A. Gargunnock Vol.XVIII (1796) p.106.
134. Ibid.
135. O.S.A. St Ninians Vol.XVIII (1796) p.389-90.
136. Graham P. (1812)op.cit. p.158.
137. Ibid.
138. Ibid.
139. Ibid.
140. Ibid.

141. Ibid.

142. N.S.A. Vol.VIII (1845) Alva p.185; Denny p.126; Bothkennar p.202; Falkirk p.15; Killearn p.69; Larbert p.371; Logie p.229; Strathblane p.85.

143. N.S.A. Vol.VIII (1845) Kippen p.269.

144. N.S.A. Vol.VIII (1845) Stirling p.429; Polmont p.197.

145. Highland & Agricultural Society Census 1854 p.6; 1856 p.9.

146. Parliamentary Papers 1866 (3727)LX 1; 1871 c460 LXIX 271.

147. Highland & Agricultural Society Census 1854 p.6; 1857 p.7.

148. Parliamentary Papers 1866 (3727)LX 1; 1869

149. Parliamentary Papers 1874 c1033 LXIX 627.

150. June Returns 1870 (Stirlingshire) S.R.O. AF 39/30/1.

151. Kames, Lord (1815) op.cit. p.132.

CHAPTER 7

1. Sinclair J. (1814) op cit Vol.II p.39.
2. Ibid, Parry M.L. Climatic Change, Agriculture and Settlement (1978).
3. Sinclair J. (1814) op cit Vol.II p.40.
4. Ibid.
5. Ibid p.41.
6. Ibid p.24.
7. Ibid p.24-5.
8. Ibid p.25-26.
9. Ibid p.27.
10. Ibid p.29.
11. Ibid p.18.
12. Ibid.
13. Ibid.
14. Ibid p.18-19.
15. Ibid p.19.
16. Ibid p.3.
17. Ibid p.3-4.
18. Ibid p.3
19. Ibid p.5
20. Ibid
21. Kames, Lord (1815) op cit p.148; Sinclair J. (1814) op cit Vol.I p.533.
22. Sinclair J. (1814) op cit Vol.I p.534.

23. Ibid p.535.
24. Ibid
25. Ibid. Care had to be taken to avoid using annual ribrass which would die out after a year.
26. Ibid p.538.
27. Ibid p.539.
28. Ibid.
29. Ibid p.536.
30. Ibid.
31. Watson J.A.S. & More J.A. (1944) op cit p.357.
32. Ibid p.274.
33. Kames, Lord (1815) op cit p.148; Watson J.A.S. & More J.A. (1944) op cit p.365.
34. Watson J.A.S. & More J.A. (1944) op cit p.366.
35. Kames, Lord (1815) op cit p.149.
36. Ibid; Watson J.A.S. & More J.A. (1944) op cit p.366.
37. Watson J.A.S. & More J.A. (1944) op cit p.367.
38. Ibid; Kames, Lord (1815) op cit p.153.
39. Kames, Lord (1815) op cit p.157-9. They are listed by Kames.
40. Sinclair J. (1814) op cit Vol.I p.540.
41. Ibid p.543.
42. Watson J.A.S. & More J.A. (1944) op cit p.348.
43. Sinclair J (1814) op cit Vol.I p.544; Watson J.A.S. & More J.A. (1944) op cit p.348.
44. Sinclair J (1814) op cit Vol.I p.544.
45. Ibid p.547.
46. Robson J. (1794) op cit p.8-12.
47. Ibid p.12.
48. Ibid p.13.
49. Ibid p.19; p.24.
50. Ibid p.55.
51. Ibid.
52. Ibid p.56.
53. Ibid p.57.
54. O.S.A. Kilbrandon & Kilchattan Vol.XIV (1795) p.158.
55. O.S.A. Glassary Vol.XIII (1794) p.659; Colonsay Vol.XII (1794) p.328.
56. O.S.A. Kilmadan Vol.IV (1792) p.339; Kilmalie Vol.VIII (1793) p.425.
57. O.S.A. Lismore Vol.I (1791) p.489; Ardchattan Vol.VI (1793) p.176.
58. O.S.A. Kilmartin Vol.VIII (1793) p.100; Kilcalmonell Vol.X (1794) p.61.; Craignish Vol.VII (1793) p.441.

59. O.S.A. Ardnamurchan Vol.XX (1798) p.295; Campbeltown Vol.X (1794) p.549; Jura Vol.XII (1794) p.320.

60. O.S.A. Glenorchy Vol.VIII (1793) p.337; Lochgoilhead Vol. III (1792) pp.160-193.

61. Smith J. (1813) op cit p.119.

62. Ibid p.120.

63. Ibid.

64. Ibid p.121.

65. N.S.A. Vol.VII (1845) Craignish p.56; Kilchonan p.655; Strachur p.106; Tiree p.216; Dunoon p.616; Torosay p.290.

66. N.S.A. Vol.VII (1845) Killean p.388; Kilfinichen p.308.

67. N.S.A. Vol.VII (1845) Kilninian p.344.

68. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

69. Parliamentary Papers 1874 c1033 LXIX 627

70. June Returns 1870 (Argyllshire) SRO AF39/2/1.

71. Aiton W. (1811) op cit p.285.

72. Fullarton W (1793) op cit p.31.

73. Ibid p.32.

74. Ibid p.30.

75. O.S.A. Dalrymple Vol.IV (1792) p.306; Auchinleck Vol.XI (1794) p.431; Dreghorn Vol.IV (1792) p.281.

76. O.S.A. Kilwinning Vol.XI (1794) p.152; Kirkoswald VolX (1794) p.487.

77. O.S.A. Largs Vol.XVII (1796) p.504.

78. O.S.A. Old Cumnock Vol.VI (1793) p.412.

79. O.S.A. Tarbolton Vol.XIX(1797) p.455; Newton-Upon-Ayr Vol.II (1792) p.265.

80. O.S.A. Galston Vol.II (1792) p.76.

81. O.S.A. Loudoun Vol.III (1792) p.107-8; Craigie Vol.V (1793) p.371.

82. O.S.A. Dalry Vol.XII (1794) p.95.

83. O.S.A. Ayr Vol.I (1791) p.92; Beith Vol.VIII (1793) p.315.

84. O.S.A. Stevenston Vol.VII (1793) p.30.

85. Aiton W. (1811) op cit p.281.

86. Ibid.

87. Ibid p.282.

88. Ibid p.283.

89. Ibid p.286.

90. Ibid p.309.

91. Ibid.

92. Ibid p.310.

93. Ibid p.313.

94. Ibid.

95. e.g. N.S.A. Vol.V (1845) Ayr p.49; Ochiltree p.112; Sorn p.138; Monkton p.175; Dalry p.232; Ballantrae p.421; Coylton p.660; Kilbirnie p.715.

96. N.S.A. Vol.V (1845) Dailly p.387.

97. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1957 p.7; Parliamentary Papers1866 (3727) LXl.

98. Parliamentary Papers 1867-1874.

99. June Returns 1870 (Ayrshire) SRO AF 39/3/1.

100. Heron R (1794 op cit p.55.

101. Ibid p.56.

102. O.S.A. Kilbride Vol.VIII (1793) p.578; Kilmorie Vol.IX (1793) p.169-170; Kingarth Vol.I (1791) p.309.

103. Headrick J. (1807) op cit p.330-333.

104. Ibid p.333.

105. Aiton W (1816) op cit p.196-241.

106. Ibid p.196-197.

107. Ibid p.221.

108. N.S.A. Vol.V (1845) Kilbride p.30.

109. N.S.A. Vol.V (1845) Kilbride p.31; Kilmorie p.61.

110. N.S.A. Vol.V (1845) Rothesay p.108.

111. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

112. Parliamentary Papers 1866 3727 LXl.

113. June Returns 1870 (Buteshire) SRO AF 39/6.

114. Ure D (1794) op cit p.55.

115. Ibid.

116. Ibid p.57.

117. O.S. A New Kilpatrick Vol.VII (1793) p.101; Kirkintilloch Vol.II (1792) p.278; Cardross Vol.XVII (1796) p.210; Bonhill Vol.III (1792) p.449.

118. O.S.A. Luss Vol.XVII (1796) p.259.

119. Whyte A & Macfarlan D (1811) op cit p.132.

120. Ibid p.145.

121. Ibid p.132 & p.134.

122. Ibid p.146.

123. Ibid p.140.

124. Ibid p.141.

125. Ibid p.141.

126. Ibid p.139.

127. N.S.A. Vol.VIII (1845) Kirkintilloch p.199.

128. N.S.A. Vol.VIII (1845) Cumbernauld p.150.

129. N.S.A. Vol.VIII (1845) Kilmaronock p.216; New Kilpatrick p.55.

130. Highland & Agricultural Society Census 1854 p.6; Parliamentary Papers 1867 (3941) LXXI 125.

131. Parliamentary Papers 1869 (4200) LXll 507.

132. June Returns 1870 (Dunbartonshire) SRO AF 39/10/1

133. Naismith J. (1794) op cit p.57.

134. Ibid.

135. Naismith J. (1798) op cit p.93.

136. Ibid p.94.

137. e.g. O.S.A. West Monkland Vol.VII (1793) p.379; East Monkland Vol.VII (1793) p.270: Bothwell Vol.XVI (1795), p.310; Culter Vol.VI (1793) p.76; Dalserf Vol.II (1792) p.376; Dunsyre Vol.I (1791) p.339; Dolphinton Vol. XIV (1795) p.109; Carnwath Vol.X (1794) p.328; Cadder Vol.VIII (1793) p.476; Rutherglen Vol.IX (1793) p.2; Avondale Vol.IX (1793) p.384; Govan Vol.XIV (1795) p.287; Cambusnethan Vol.XII (1794) p.570; Lanark VolXV (1795) p.16; Covington Vol.I (1791) p.190; Libberton Vol.II (1792) p.239.

138. O.S.A. Hamilton Vol.II (1792) p.186.

139. O.S.A. Shotts Vol.XV (1795) p.51.

140. O.S.A. Cambuslang Vol.V (1793) p.247.

141. O.S.A. Blantyre Vol.II (1792) p.218.

142. O.S.A. Stonehouse Vol.II (1792) p.224; Lesmahagow Vol. VIII (1793) p.427.

143. O.S.A. Crawford Vol.IV (1792) p.508.

144. N.S.A. Vol.VI (1845) Cadder p.410.

145. Highland & Agricultural Society Census 1854 p.6; 1856 p.9; Parliamentary Papers 1866 3727 LXl.

146. Parliamentary Papers 1872 c675 LXIII 675.

147. Martin A (1794) op cit pp.8-9.

148. Ibid p.10.

149. Ibid p.11.

150. Ibid p.11-13.

151. O.S.A. Lochwinnoch Vol.XV (1795) p.73; Kilbarchan Vol. XV (1795) p.499.

152. O.S.A. Kilbarchan Vol.XV (1795) p.501.

153. O.S.A. Kilmacolm Vol.IV (1792) p.276.

154. O.S.A. Inverkip Vol.IX (1793) p.97.

155. O.S.A. Inchinnan Vol.III (1792) p.533; Houston Vol.I (1791) p.324.

156. O.S.A. Renfrew Vol.II (1792) p.173.

157. Wilson J. (1812)op cit p.110.

158. Ibid.

159. Ibid p.111.

160. Ibid p.108.

161. Ibid.

162. Ibid p.109.

163. Ibid p.110.

164. Highland & Agricultural Society Census 1854 p.6; 1856 p.9. Parliamentary Papers 1866 3727 LXl.

165. June Returns 1870 (Renfrewshire) SRO AF 39/26/1

166. Belsches R (1796) op cit p.33.

167. Ibid.

168. Ibid p.34.

169. Ibid.

170. O.SA. Baldernock Vol.XV (1795) p.276.

171. O.S.A. St. Ninians Vol.XVIII (1796) p.388.

172. Ibid p.389-90.

173. O.S.A. Buchanan Vol.IX (1793) p.19; Killearn Vol.XVI (1795) p.114.

174. O.S.A. Kilsyth Vol. XVIII (1796) p.282.

175. O.S.A. Strathblane Vol. XVIII (1796) p.566.

176. Ibid.

177. Ibid p.566-7.

178. O.S.A. Fintry Vol.XI (1794) p.373-4.

179. O.S.A. Slammanan Vol.XIV (1795) p.83.

180. Graham P (1812)op cit p.179.

181. Ibid p.181.

182. Ibid.

183. Ibid.

184. Ibid p.192.

185. Ibid p.193.

186. Ibid. p.186.

187. e.g. N.S.A. Vol.VIII (1845) Falkirk p.15. Strathblane p.85; Denny p.127; Kilsyth p.158; Baldernock p.173; Alva p.186;

188. Highland & Agricultural Society Census 1857 p.7. Parliamentary Papers 1866 3727 LXl.

189. June Returns 1870 (Stirlingshire) SRO AF 39/30/1.

190. Parliamentary Papers, 1869 (4200) LXII 507 p.8.

CHAPTER 8

Rotations

1. Sinclair J (1814)op cit Vol.I p.446.
2. Ibid; Watson J.A.S. & More J.A. (1961) op cit p.311.
3. Sinclair J (1814) op cit Vol.I p.426.
4. Watson J.A.S. & More J.A. (1961) op cit pp.206,222,234,240. 280, 311, 315.
5. Ure D. (1794) op cit p.45.
6. Handley J.E. Scottish Farming in the Eighteenth Century 1953 p,38.
7. O.S.A. Dalry Vol.XII (1794) p.94-5.
8. O.S.A. Dalserf Vol.II (1792) p.376.
9. O.S.A. Bothwell Vol.XVI (1795) p.310.
10. Whyte I.D. (1974) op cit p.150-7; Smith J. (1813) op cit p.78.
11. Ure D (1794) op cit p.46.
12. Ure D (1794) op cit p.45-6.
13. Whyte A. & Macfarlan D. (1811) op cit p.92.
14. O.S.A. West Kilbride Vol. XII (1794) p.407-8.
15. O.S.A. Kilmaurs Vol.IX (1793) p.361.
16. O.S.A. Kirkoswald Vol.X (1794) p.487.
17. Belsches R. (1796) op cit p.29.
18. O.S.A. Fintry Vol.XI (1794) p.373-4.
19. O.S.A. Inverchaolain Vol.V (1793) p.466; Kilmartin Vol. VIII (1793) p.99; Saddell & Skipness Vol. XII (1794) p.476.
20. Smith J. (1813) p.78.
21. Ibid.
22. SRO GD 170/568; GD 170/568/4.
23. Headrick J. (1807) op cit p.330.
24. Ibid. p.331-2.
25. Ibid.
26. Aiton W. (1816) op cit p.182-4.
27. N.S.A. Vol.V (1845) Kilbride p.30.
28. O.S.A. Pettinain Vol.XII (1794) p.33.
29. O.S.A. Lanark Vol.XV (1795) p.15.
30. N.S.A. Vol.VII (1845) Killean & Kilchenzie p.388-9.
31. N.S.A. Vol.VII (1845) Inverchaolain p.113; Vol.VI (1845) Biggar p.365.

32. O.S.A. Lanark Vol.XIV (1795) p.17.

33. Ure D (1794) op cit p.48; N.S.A. Vol. VI (1845) Carmichael p.529.

34. Whyte A & Macfarlan D. (1811) op cit p.92.

35. N.S.A. Vol.VIII (1845) Kilmaronock p.216; O.S.A. Strathblane Vol.XVIII (1796) p.566; N.S.A. Vol.VIII (1845) Strathblane p.84.

36. Ure D. (1794) op cit p.48; Whyte A & Macfarlan D. (1811) op cit p.94-5.

37. N.S.A. Vo4.VIII (1845) Kirkintilloch p.197.

38. O.S.A. Airth Vol.III (1792) p.490.

39. Whyte A & Macfarlan D. (1811) op cit p.93.

40. N.S.A. Vol. VI (1845) Lanark p.21.

41. Martin A. (1794) op cit p.12, 11, 14.

42. O.S.A. Erskine Vol. IX (1793) p.63; Kilbarchan Vol.XV (1795) p.501.

43. O.S.A. Kilbarchan Vol. XV (1795) p.499; Wilson J. (1812) op cit p.97.

44. Wilson J. (1812) op cit. p.97-8.

45. N.S.A. Vol.VII (1845) Eaglesham p.400; Lochwinnoch p.112.

46. O.S.A. Sorn Vol.XX (1798) p.148; Monkton Vol.XII (1794) p.398

47. Aiton W. (1811) op cit p.247.

48. N.S.A. Vol.V (1845) op cit ; Galston p.186; Dunlop p.299; Dundonald p.680; Dreghorn p.526; Tarbolton p.758; Sorn p.138; Riccarton p.613; Ochiltree p.112; Kilbirnie p.71 Dalrymple p.283; Dalry 226; Ayr p.49; Colmonell p.530; Coylton p.659.

49. N.S.A. Vol.V (1845) Barr p.411.

50. N.S.A. Vol.V (1845) Kilwinning p.828; Muirkirk p.154.

51. O.S.A. Fintry Vol.XI (1794) p.373; St. Ninians Vol.XVIII (1796) p.389-90; Falkirk Vol.XIX (1797) p.81.

52. Belsches R. (1796) op cit p.34; Graham P. (1812) op cit p.144.

53. Graham P. (1812) op cit p.143.

54. Ibid p.143-4; SRO GD 1/393/46.

55. Graham P. (1812) op cit p.143-4.

56. Ibid p.144-5.

57. N.S.A. Vol.VIII (1845) Larbert p.372.

58. N.S.A. Vol.VIII (1845) Gargunnock p.54.

59. N.S.A. Vol.VIII (1845) Strathblane p.84; Muiravonside p.213.

60. N.S.A. Vol.VIII (1845) Drymen p.109; Polmont p.197.

61. S.R.O. GD 1/393/46.

62. e.g. S.R.O. GD 170/568; GD 170/568/4; GD 112/10/2/2/3; GD 247/17/L; GD 112/10/5.

63. S.R.O. GD 112/10/2/5.

64. N.S.A. Vol. VII (1845) Kilmadan p.673; Saddell p.450; Lismore p.246; Morvern p.188; N. Knapdale p.640.

65. N.S.A. Vol.VII (1845) Kilmore p.528; Dunoon p.616; Kilbrandon p.77; Torosay p.290; Killean p.388.

66. SRO GD 112/10/4/4/3.

67. N.S.A. Vol.V (1845) Kilbride p.30; Kilmorie p.61.

68. N.S.A. Vol.V (1845) Rothesay p.107-8.

69. Ure D. (1794) op cit p.47; Whyte A. & Macfarlan D. (1811) op cit p.93.

70. Whyte A & Macfarlan D (1811) op cit p.93; Ure D. (1794) op cit p.47.

71. Ure D. (1794) op cit p.47.

72. N.S.A. Vol.VIII (1845) Kirkintilloch p.197; Kilmaronock p.216.

73. N.S.A. Vol.VIII (1845) New Kilpatrick p.55; Cumbernauld p.149.

74. Ure D. (1794) op cit p.47.

75. O.S.A. Dalserf Vol.II (1792) p.376. Other farms in the parish produced wheat/peas or peas & beans/oats/oats or barley and grass seed/hay /hay/pasture.

76. Naismith J. (1794) op cit p.63-4; O.S.A. Symington Vol.VIII (1793) p.586; Lanrk VolXV (1795) p.17; Avondale Vol.IX (1793) p.384; Govan Vol.XIV (1795) p.287

77. Naismith J. (1794) op cit p.64; OSA Dalserf Vol.II (1792) p.376; Bothwell VolXVI (1795)p.310; Cambusnethan Vol.XII (1794)p.570; Lesmahagow Vol.VII (1793) p.427; West Monkland Vol.VII (1793) p.378.

78. N.S.A. Vol. VI (1845) Stonehouse p.473; Carnwath p.85; Wandell p.824; Govan p.695; Old. Monkland p.656.

79. N.S.A. Vol.VI (1845) Lanark p.21; Carstairs p.559; Carmnnock p.604; Culter p.349; Carmichael p.529; Libberton p.45; Biggar p.365 ; Dalziel p.456.

80. N.S.A. Vol.VI (1845) Libberton p.45; Vol.VIII (1845) New Kilpatrick p.55 Vol.V (1845) St.Quivox p.121.

81. N.S.A. Vol.VI (1845) Dalziel p.456; Bothwell p.795.

82. Martin A (1794) op cit p.8, p.9, p.10, p.15, p.16, p.18, p.21, p.22.

83. Wilson J. (1812) op cit p.99.

84. Ibid.

85. Ibid p.98; Martin A (1794) op cit p.11.

86. N.S.A. Vol.VII (1845) Eastwood p.39; Cathcart p.507; Erskine p.518; Renfrew p.23.

87. N.S.A. Vol.VII (1845) Paisley p.258.

88. N.S.A. Vol.V (1845) Ballantrae p.420; Dalrymple p.283; Dreghorn p.526; Kilbirnie p.712; Kilwinning p.828; Largs p.802; St.Quivox p.121; Beith p.589; Tarbolton p.758, Vol.VIII (1845) Kilmaronock p.216.

89. N.S.A. Vol.V (1845) Dailly p.387.

90. Aiton W. (1811) op cit pp.252-257.

91. Report of The Best Managed Farms in Kintyre T.H.A.S.S. 1st Series Vol.IV p.544.

92. S.R.O. R.H.P. 972/5.

93. S.R.O. R.HP 20,080.

Manures

1. The term manure covers all substances used to enrich the soil. Sinclair J. (1814) op cit Vol.II p.508; Watson J.A.S. & More J.A. (1924) op cit p.44.

2. Watson J.A.S. & More J.A. (1924) op cit p.44.

3. Kames, Lord (1815) op cit p.272.

4. Watson J.A.S. & More J.A. (1924) op cit p.55.

5. Ibid.

6. Sinclair J. (1814) op cit Vol.II p.509.

7. Ibid p.510.

8. Ibid p.511.

9. Ibid p.524.

10. Ibid p.513.

11. Ibid.

12. Ibid p.514.

13. Ibid.

14. Ibid.

15. Ibid p.515.

16. Ibid.

17. Ibid p.517.

18. Ibid.

19. Ibid p.518-9.

20. Sinclair J. (1813) op cit Vol.I p.182; (1814) op cit Vol.II p.526-7.

21. Ibid p.183.

22. Sinclair J. (1814) op cit Vol.II p.527.

23. Whyte I.D. (1794) op cit p.125-6.

24. Sinclair J. (1814) op cit Vol.II p.525.

25. Ibid p.526.

26. Ibid p.525. Naismith observed that Glasgow dung was carried 6-7 miles. Naismith J. (1798) op cit p.81.

27. Whyte I.D. (1974) op cit p.127-9. Watson J.A.S. & More J.A. (1944) op cit p.93.
28. Sinclair J. (1814) op cit Vol.II p.531
29. Ibid. p.532.
30. Sinclair J. (1814) op cit Vol.II p.533.
31. Ibid.
32. Ibid.
33. Ibid p.534.
34. Ibid p.535.
35. Ibid p.540; Whyte I.D. (1974) op cit p.126-7.
36. Sinclair J. (1814) op cit Vol.II p.539.
37. Ibid.
38. Ibid.
39. Whyte I.D. (1974) op cit p.117; Sinclair J. (1814) op cit Vol.II p.528.
40. Watson J.A. S. & More J.A. (1944) op cit p.88.
41. Sinclair J. (1813) op cit Vol.I p.314.
42. Ibid. O.S.A. Ardrossan Vol.VII (1793) p.44-5.
43. O.S.A. Strachur & Stralachlan Vol.IV (1792) p.558; Port Glasgow Vol.V (1793) p.546.
44. Sinclair J. (1814) op cit Vol.II p.530.
45. Ibid p.540.
46. Ibid p.544.
47. Ibid p. 545
48. Ibid p.541.
49. Ibid p.544.
50. Ibid p.544; Watson J.A.S. & More J.A. (1944) op cit p.87.
51. Sinclair J. (1814) op cit Vol.II p.543.
52. Ibid.
53. Watson J.A.S. & More J.A. (1944) op cit p.87.
54. Ibid p.71.
55. Ibid; Witney D. Scottish Agriculture Major Economic Trends, 1857-1957, in centenary of the Edinburgh University Agricultural Society 1957.
56. Landells J. Agriculture (in Ordnance Gazetteer of Scotland) (1885) p.40.
57. Watson J.A.S. & More J.A. (1944) op cit p.86-7; Encyclopaedia Britannica Vol.X p.932.
58. Ibid.
59. Mathew W. Peru & The British Guano Market, 1840-70 in Economic History Rev. 23 1970, p.112.

60. Ibid. p.113.
61. Robson J. (1794) op cit p.19-20.
62. O.S.A. Lismore Vol.I (1791) p.490.
63. Robson J. (1794) op cit p.20; Lismore Vol.I (1791) p.490.
64. S.R.O. GD 170/569/1.
65. Robson J. (1794) op cit p.24.
66. Ibid p.30; p.25.
67. Ibid p.33.
68. Ibid. p.55.
69. Ibid. p.56.
70. Ibid. p.57; Heron R. (1794) op cit p.69.
71. O.S.A. Jura & Colonsay Vol.XII (1794) p.321.
72. O.S.A. Saddell & Skipness Vol.XII (1794) p.476.
73. O.S.A. Kilmartin Vol.VIII (1793) p.100.
74. O.S.A. Kilbrandon & Kilchattan Vol.XIV (1795) p.159.
75. Ibid.
76. O.S.A. Kilarrow & Kilmeny Vol.XI (1794) p.299.
77. O.S.A. Inverchaolain Vol.V (1793) p.466.
78. Ibid.
79. O.S.A. Kilchonan Vol.XI (1794) p.277.
80. O.S.A. Kilcalmonell Vol.X (1794) p.62.
81. Ibid. p.61.
82. O.S.A. Craignish Vol.VII (1793) p.441.
83. O.S.A. Gigha & Cara Vol.VIII (1793) p.39.
84. O.S.A. Kilfinan Vol.XIV (1795) p.289.
85. Ibid p.240.
86. O.S.A. Kilfinichen Vol.XIV (1795) p.181; 193.
87. O.S.A. Kilmartin Vol.VIII (1793) p.93; p.95.
88. O.S.A. Kilmore & Kilbride Vol.XI (1794) p.123.
89. O.S.A. Lochgoilhead & Kilmorich Vol.III (1792) p.164-5.
90. O.S.A. Saddell & Skipness Vol.XII (1794) p.483.
91. O.S.A. Southend Vol.III (1792) p.364.
92. Ibid. p.367.
93. O.S.A. Strachur & Stralachlan Vol.IV (1792) p.558.
94. Smith J. (1813) op cit pp.209-224.
95. Ibid p.212.
96. Ibid p.210.
97. Ibid p.217.
98. Ibid p.216.

99. Ayton R.A. Voyage Round Great Britain Summer, 1813 (1814-20) Vol.III p.64.

100. S.R.O. GD 112/12/1.

101. N.S.A. Vol.VIII (1845) Ardnamurchan p.151; p152.

102. N.S.A. Vol.VII (1845) Invarary p.28; Inverchaolain p.113.

103. N.S.A. Vol.VII (1845) Kilchonan p.654.

104. N.S.A. Vol.VII (1845) Kildalton p.665.

105. N.S.A. Vol.VII (1845) Kilfinichen p.308.

106. N.S.A. Vol.VII (1845) Kilarrow p.670.

107. N.S.A. Vol.VII (1845) Killean p.389.

108. Ibid.

109. N.S.A. VOl.VII (1845) Torosay p.291; South Knapdale p.264.

110. S.R.O. GD 112/12/1.

111. S.R.O. GD 64/3/69.

112. Fullarton W. (1793) op cit p.20-21.

113. Ibid p.49.

114. Ibid p.50.

115. Ibid.

116. Ibid. p.52.

117. Ibid. p.49

118. Ibid.

119. Ibid p.52.

120. O.S.A. Stevenston Vol.VII (1793) p.30; p.6.

121. O.S.A. Colmonell Vol.II (1792) p.62-3; Kilmarnock Vol. II (1792) p.102.

122. O.S.A. Kirkoswald Vol.X (1794) p.486; 488.

123. O.S.A. Newton-upon-Ayr Vol.II (1792) p.265.

124. O.S.A. Beith Vol.VIII (1793) p.326; Ardrossan Vol.VII (1793) p.44-5.

125. O.S.A. Barr Vol.XII (1794) p.84.

126. O.S.A. Ballantrae Vol.I (1791) p.113; p.109.

127. O.S.A. Ayr Vol.I (1791) p.92.

128. O.S.A. Craigie Vol.V (1793) p.370.

129. O.S.A. Old Cumnock Vol.VI (1793) p.408.

130. O.S.A. Dalry Vol.XII (1794) p.94.

131. O.S.A. Dundonald Vol.VII (1793) p.261-2.

132. O.S.A. Fenwick Vol.XIV (1795) p.55.

133. O.S.A. Muirkirk Vol.VII (1793) p.603.

134. O.S.A. Galston Vol.II (1792) p.75.

135. O.S.A. West Kilbride Vol.XII (1794) p.407.

136. O.S.A. Kilmarnock Vol.II (1792) p.99.
137. O.S.A. Kilmaurs Vol.IX (1793) p.361.
138. O.S.A. Kirkoswald Vol.X (1794) p.488-9.
139. O.S.A. Kirkmichael Vol.VI (1793) p.103.
140. O.S.A. Loudoun Vol.III (1792) p.109; Monkton Vol. XII (1794) p.399.
141. O.S.A. Sorn Vol.XX (1798) p.149.
142. Aiton W. (1811) op cit pp.377-400.
143. Ibid p.383.
144. Ibid p.391.
145. Ibid. p.377.
146. Ibid. p.387; p.396.
147. Ibid. p.384.
148. S.R.O. GD 25/77.
149. S.R.O. GD 109/3798.
150. S.R.O. GD 142/6/60.
151. N.S.A. Vo.V (1845) Ayr p.49; Beith p.590.
152. N.S.A. Vol.V (1845) Barr p.411; New Cumnock p.519; Dalry p.229; Sorn p.139.
153. N.S.A. VOl.V (1845) Dailly p.387.
154. N.S.A. Vol.V (1845) Dalmellington p.317.
155. N.S.A. Vol.V (1845) Dunlop p.299-300; Kilbirnie p.714.
156. N.S.A. Vol.V (1845) West Kilbride p.262.
157. N.S.A. Vol.V (1845) Ochiltree p.112.
158. N.S.A. Vol.V (1845) Colmonell p.530.
159. N.S.A. Vol.V (1845) Dailly p.387.
160. N.S.A. Vol.V (1845) Ballantrae p.420.
161. Ibid. p.417.
162. N.S.A. Vol.V (1845) Straiton p.341; Maybole p.369.
163. N.S.A. Vol.V (1845) Dalry p.227.
164. N.S.A. Vol.V (1845) St. Quivox p.121; Largs p.802.
165. N.S.A. Vol.V (1845) Girvan p.401; West Kilbride p.262.
166. S.R.O. GD 60/193.
167. Sturrock A (1866-7) op cit p.88.
168. Ibid. p.33.
169. Headrick J. (1807) op cit p.342.
170. Macdonald J. (1811) op cit p.394.
171. Ibid p.400.
172. Aiton W. (1816) op cit p.265; 269.

173. N.S.A. Vol.V (1845) Kilbride p.30; Kilmorie p.60; Kingarth p.90; Rothesay p.108.

174. N.S.A. Vol.V (1845) Kilbride p.31.

175. N.S.A. Vol.V (1845) Rothesay p.107.

176. N.S.A. Vol.V (1845) Rothesay p.107; Kingarth p.91.

177. Ure D. (1794) op cit p.30-31.

178. Ibid p.34-35.

179. Ibid p.33.

180. Ibid p.37.

181. Ibid p.38.

182. Ibid p.32.

183. O.S.A. Cardross Vol.XVII (1796) p.211.

184. Ibid; O.S.A. Old Kilpatrick Vol.V (1793) p.232.

185. O.S.A. New Kilpatrick Vol.VII (1793) p.108.

186. O.S.A. Dumbarton Vol.IV (1792) p.26; Rhu Vol.IV (1792) p.406; Cardross Vol.XVII (1796) p.211.

187. O.S.A. Kirkintilloch Vol.II (1792) p.278.

188. Whyte A & Macfarlan D. (1811) op cit p.189.

189. Ibid.

190. Ibid.

191 Ibid p.194.

192. Ibid p.199.

193. Ibid p.194-6.

194. Ibid p.197.

195. Ibid.

196. Ibid.

197. Ibid.

198. N.S.A. Vol.VIII (1845) Rhu p.78.

199. N.S.A. Vol.VIII (1845) Roseneath p.125.

200. N.S.A. Vol.VIII (1845) Cumernauld p.149.

201. N.S.A. Vol. VIII (1845) Cardross p.89.

202. N.S.A. Vol.VIII (1845) New Kilpatrick p.59.

203. N.S.A. Vol.VIII (1845) New Kilpatrick p.55.

204. N.S.A. Vol.VIII (1845) Kirkintilloch p.197; Kilmaronock p.216.

205. Naismith J. (1794) op cit p.61.

206. Ibid.

207. Ibid.

208. Ibid.

209. Naismith J. (1798) op cit p.80.

210. Naismith J. (1794) op cit p.61-2.

211. Ibid p.62.

212. Ibid.

213. O.S.A. Lesmahagow Vol.VII (1793) p.427; Lamington Vol.VI (1793) p.554.

214. Grossart W. A. History of Shotts 1880 p.215.

215. O.S.A. West Monkland Vol.VII (1793) p.378; East Monkland Vol.VII (1793) p.271.

216. Ibid.

217. O.S.A. Shotts Vol.XV (1795) p.50.

218. O.S.A. Bothwell Vol.XVI (1795) p.310; p.313.

219. O.S.A. Carluke VIII (1793) p.128; p.138

220. O.S.A. Carmunnock XVIII (1796) p.164; p.160.

221. O.S.A. Cambuslang Vol.V (1793) p.248.

222. N.S.A. Vol.VI (1845) Rutherglen p.387-8.

223. O.S.A. Libberton Vol.II (1792) p.234; Cadder Vol.VIII (1793) p.475, Lamington Vol.VI (1793) p.554.

224. Naismith J. (1813) op cit p.102.

225. N.S.A. Vol.VI (1845) Govan p.695.

226. N.S.A. Vol.VI (1845) New Monkland p.244.

227. N.S.A. Vol.VI (1845) Carmunnock p.605; p.604.

228. N.S.A. Vol.VI (1845) Bothwell p.794.

229. N.S.A. Vol.VI (1845) Cambuslang p.435.

230. N.S.A. Vol.VI(1845) Carluke p.588; Dalziel p.468.

231. N.S.A. Vol.VI(1845) Dalziel p.468.

232. N.S.A. Vol.VI (1845) Coulter p.349.

233. N.S.A. Vol.VI (1845) Biggar p.365; p.356.

234. N.S.A. Vol.VI (1845) Carnwath p.86.

235. Ibid.

236. N.S.A. Vol.VI (1845) Carstairs p.557.

237. N.S.A. Vol.VI (1845) Pettinain p.542.

238. Grossart W. 1880 op cit p.215.

239. Martin A (1794) op cit p.8

240. Ibid. p.9

241. Ibid p.11

242. Ibid p.12.

243. Ibid p.18

244. Ibid p.15

245. Ibid p.10.

246. Ibid p.12.
247. O.S.A. Cathcart Vol.V(1793) p.341-2.
248. Martin A. (1794) op cit p.18.
249. O.S.A. Port Glasgow Vol.V (1793) p.546.
250. O.S.A. Kilmacolm Vol.IV (1792) p.275.
251. O.S.A. Greenock Vol.V (1793) p.561-2.
252. O.S.A. Houston Vol.I (1791) p.325.
253. Wilson J. (1812) op cit p.132; 134.
254. Ibid p.132.
255. Ibid p.133.
256. Ibid.
257. Ibid p.134.
258. Ibid.
259. Ibid.
260. Ibid.
261. Ibid.
262. Ibid p.135.
263. Ibid p.136.
264. N.S.A. VOl.VII (1845) Renfrew p.22.
265. N.S.A. Vol.VII (1845) Cathcart p.498.
266. N.S.A. Vol.VII (1845) Paisley p.257.
267. N.S.A. Vol.VII (1845) Greenock p.432.
268. N.S.A. Vol.VII (1845) Houston p.50.
269 Belsches R. (1796) op cit p.34.
270. Ibid p.35.
271. Ibid.
272. Ibid p.37-8.
273. Ibid p.38.
274. Ibid p.39.
275. O.S.A. Gargunnock Vol.XVIII (1796) p.107.
276. O.S.A. Fintry Vol.XI(1794) p.373.
277. O.S.A. Buchanan Vol.IX (1793) p.19.
278. O.S.A. Campsie Vol.XV (1795) p.244.
279. O.S.A. Denny Vol.II (1792) p.430; Drymen Vol.VIII (1793) p.548.
280. O.S.A. Kippen Vol.XVIII (1796) p.350.
281. O.S.A. Kilsyth Vol.XVIII (1796) p.233.
282. S.R.O. GD 15/41.
283. Graham P. (1812) op cit p.253.

284. N.L.S. MS 10834.

285. Graham P. (1812) op cit p.262.

286. Ibid. p.264.

287. Ibid. p.267.

288. N.S.A. Vol.VIII (1845) Falkirk p.16; p.15; p.14.

289. N.S.A. Vol.VIII (1845) Campsie p.240; p.251.

290. N.S.A. Vol.VIII (1845) Denny p.126.

291. N.S.A. Vol.VIII (1845) Gargunnock p.54; Muiravonside p.213. Slamanan p.277.

292. N.S.A. Vol.VIII (1845) St. Ninians p.328.

293. N.S.A. Vol.VIII (1845) Larbert p.372.

294. N.S.A. Vol.VIII (1845) Polmont p.197.

295. Sturrock A. (1866-7) op cit p.34.

CHAPTER 9

Livestock Section

1. Prothero R.E. (Lord Ernle) (1961) op cit p.xxvi.

2. Ibid. Chambers J.D. & Mingay G.E. The Agricultural Revolution , 1750-1880, 1966 p.22.

3. Ibid p.xxviii.

4. Chambers J.D. & Mingay G.E. (1966) op cit p.65-69.

5. Transactions of H & A Soc. of Scotland. New Series Vol.VIII 1843 'The Vetinary College P.445.

6. Smout T.C. (1792) op cit p.373; comments by ministers in most parishes of O.S.A.

7. Whetham E. Prices & Production in Scottish Farming, 1850-70 p.237-8 in Scottish Journal Political Economy IX (1962).

Cattle

8. Watson J.A.S. & More J.A. (1924) op cit p.372.

9. Ibid p.373; Sinclair J. (1814) op cit Vol.III p.23.

10. Sinclair J. (1814) op cit Vol.III p.26.

11. Ibid p.27. Watson J.A.S. & More J.A. (1944) op cit p.520.

12. Watson J.A.S. & More J.A. (1944) op cit p.520.

13. Sinclair J. (1814) op cit Vol.III P.30.

14. Ibid. p.34-5.

15. Ibid. p.42.

16. Ibid. p.44.

17. Ibid. p.43. Watson J.A.S. & More J.A. (1944) op cit p.525-6.

18. Watson J.A.S. & More J.A. (1944) op cit p.525-6.
19. Sturrock A. (1866-7) op cit p.85-6.
20. Aiton W. (1816) op cit p.301.

A. The Dairy

21. Aiton W. Livestock 1812 p.201-2.
22. Sinclair J. (1814) op cit Vol.III p.67; (1813) op cit Vol.II p.119.
23. Fullarton W. (1793) op cit p.59; Naismith J. (1798) op cit p.120.
24. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.12.
25. Fullarton W. (1793) op cit p.59.
26. Ibid.
27. Ure D. (1794) op cit p.58.
28. Ibid p.59.
29. Belsches R. (1796) op cit p.46.
30. MacDonald J. (1811) op cit p.440.
31. Aiton W. (1816) op cit p.281.
32. N.S.A. Vol.V (1845) Kilbride p.29 ; Kilmorie p.47; Kingarth p.90. Rothesay p.108.
33. Wilson J. (1812) op cit p.144.
34. Sturrock A. (1866-7) op cit p.74.
35. Ibid.
36. Aiton W. (1812) op cit p.178..
37. Ibid.
38. Ibid. p.179.
39. Ibid. p.186.
40. Sinclair J. (1814) op cit Vol.V (Appendix Vol.II) p.181.
41. Ibid.
42. N.S.A. Vol.VIII (1845) Killearn p.69-70.
43. Sinclair J. (1814) op cit Vol.III p.73.
44. Sinclair J. (1813) op cit Vol.II p.119; p.124.
45. Aiton W. (1811) op cit p.448-9. J. Sinclair also noted its importance (1813) Vol.II op cit p.119.
46. Ibid. p.459.
47. Belsches R (1796) op cit p.47.
48. Report on the Present State of Agriculture in Scotland (1878)T.H.A.S.S.p.89; Sturrock A. (1866-7) op cit p.89.
49. Report on Dairy Management T.HA.S.S. Vol.V (1831) p.256; Ure D. (1794) op cit p.80. Sinclair J. (1814) op cit Vol.III p.73; Belsches R. (1796) op cit p.47.
50. Sinclair J. (1814) op cit Vol.III p.73; Belsches R. (1796) op cit p.47; Whyte A. & Macfarlan D. (1811) op cit p.220.

51. Sinclair J. (1814) op cit Vol.III p.73; (1813) op cit Vol.I p.118.
52. Sinclair J. (1813) op cit Vol.I p.118.
53. Sturrock A. (1866-7) op cit p.82.
54. Aiton W. (1812) op cit p.186; Sturrock A. (1866-7) op cit p.84.
55. Watson J.A.S. & More J.A. (1944) op cit 527.
56. Aiton W. (1811) op cit p.443.
57. Aiton W. (1812) op cit p.187.
58. Ibid. p.186.
59. Ibid.
60. Aiton W. (1811) op cit p.189. Naismith J. (1794) op cit p.66.
61. Aiton W. (1811) op cit p.442.
62. Naismith J. (1794) op cit p.65; Aiton W. (1812) op cit p.187.
63. Ibid.
64. Ibid.
65. O.S.A. Glassford Vol.VIII (1793) p.144; Stonehouse Vol.II (1792) p.224; Dalserf Vol.II (1792) p.378.
66. Whyte A. & Macfarlan D. (1811) op cit p.218; Belsches R (1796) op cit p.46.
67. Aiton W. (1811) op cit p.442.
68. O.S.A. Galston Vol.II (1792) 76; Fenwick Vol.XIV (1795) p.54.
69. Wilson J. (1812) op cit p.146.
70. Sturrock A. (1866-7) op cit p.84.
71. Aiton W. (1812) op cit p.201.
72. Ibid.
73. Sinclair J. (1814) op cit Vol.III p.75; Aiton W. (1812) op cit p.201.
74. Sturrock A. (1866-7) op cit p.82.
75. The alternative was to make butter from the cream and churn the skimmed milk.
76. Fullarton W. (1793) op cit p.60.
77. O.S.A. Galston Vol.II (1792) p.75.
78. O.S.A. Fenwick Vol.XIV (1795) p.54.
79. O.S.A. Dunlop Vol. IX (1793) p.537.
80. Ibid. Aiton W. (1812) op cit p. 201.
81. Ibid.
82. O.S.A. Fenwick Vol.XIV (1795) p.54; Galston Vol.II (1792) p.76; Beith Vol.VIII(1793) p.315; Dalry Vol.XII (1794) p.99; Stewarton Vol.IX (1793) p.378; Kilwinning Vol.XI (1794) p.154.

83. O.S.A. Sorn Vol.XX (1798) p.151.

84 O.S.A. Kirkoswald Vol.X (1794) p.491; Stair Vol.VI (1793) p.114; Tarbolton Vol.XIX (1797) p.455.

85. O.S.A. Kilwinning Vol.XI (1794) p.151; p.154

86. O.S.A. Kirkmichael Vol.VI (1793) p.105

87. Headrick J. (1807) op cit p.320.

88. Ibid.

89. Aiton W. (1816) op cit p.292; p.283.

90. O.S.A. Kilbarchan Vol.XV (1795) p.501.

91. O.S.A. Eaglesham Vol.II (1792) p.118.

92. O.S.A. East Monkland Vol.VII (1793) p.271-2.

93. O.S.A. East Kilbride Vol.III (1792) p.423; Avondale Vol.IX (1793) p.384.

94. Ure D. (1794) op cit p.71.

95. Ibid.

96 Ibid p.74.

97. Ibid p.75.

98. Ibid p.77.

99. Whyte A. & Macfarlan D. (1811) op cit p.221.

100. Naismith J. (1794) op cit p.65.

101. Ibid p.66.

102. Naismith J. (1813) op cit p.128-9.

103. Aiton W. (1811) op cit p.457.

104. Ibid p.452.

105. Sinclair J. (1814) op cit Vol.III p.71; Aiton (1811) op cit p.452.

106. Ibid.

107. Wilson J. (1812) op cit p.143.

108. Belsches R. (1796) op cit p.46.

109. Smith J. (1813) op cit p.244-5.

110. O.S.A. Tiree Vol.X (1794) p.398; Saddell Vol. XII (1794) p.477; North Knapdale Vol. VI (1793) p.259.

111. S.R.O. GD 43/80/68.

112. N.S.A. Vol.V (1845) Barr p.411.

113. N.S.A. Vol.VI (1845) Lesmahagow p.36; East Kilbride p.897. Douglas p.486; Carnwath p.87; Crawfordjohn p.508; Avondale p.307. Prizes were won by three Lanarkshire Farmers in 1823 for production of Double Gloucester Cheese. Report on Dairy Management T.H.A.S.S. I 1829 Vol.XXXI p.342.

114. N.S.A. Vol.VIII (1845) Bothkennar p.202.

115. N.S.A. Vol.VII (1845) Dunoon & Kilmun p.588; Invararay p.29.

116. Report on Dairy Management T.H.A.S.S. Vol.VI XLII page 406-7.

117. O.S.A. Pettinain Vol.XII (1794) p.35; Bothwell Vol.XVl (1795) p.312; Hamilton Vol.II (1792) p.190. Dophinton Vol. XIV (1795) p.109. Dalserf Vol.II (1792)p.318; Fintry Vol.XI (1794) p.375. Carmichael Vol.XIII (1794) p.368. Dalziel Vol.III (1792) p.462; Slammanan Vol.XIV (1795) p.83.

118. O.S.A. Killearn Vol.XVI (1795) p.115; Slammanan Vol.XIV (1795) p.83; Blantyre Vo.II (1792)p.218.

119. N.S.A. Vol.V (1845) Beith p.590; Drghorn p.526.

120. N.S.A. Vol.V (1845) Largs p.802; Stevenston p.464.

121. N.S.A. Vol.VI (1845) Dalserf p.743; Dunsyre p.71; Vol.VII (1845) Lochwinnoch p.100.

122. N.S.A. Vol.VI (1845) Pettinain P.542-3;Crawfordjohn p.508; Walston p.861.

123. N.S.A. Vol.VI (1845) Crawfordjohn p.508.

124. N.S.A. Vol.VII (1845) Eaglesham p.400.

125. N.S.A. Vol.VI (1845) Camburslang p.436.

126. Sturrock A. (1866-7) op cit p.88.

127. Ibid p.93.

128. Ibid

129. Ibid p.99

130. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.13.

131. Unless cheese was made from skimmed milk and butter from cream .

132. Sinclair J. (1814) op cit Vol.III p.60; Aiton W. (1811) op cit. p.448.

133. Sinclair J. (1814) op cit Vol.III p.60.

134. Ibid

135. Ibid p.62-3.

136. Fullarton W. (1793) op cit p.60.

137. Aiton W. (1811) op cit p.447.

138. Ure D. (1794) op cit p.71.

139. Ibid p.72.

140. Whyte A. & Macfarlan D. (1811) op cit p.221.

141. Naismith J. (1794) op cit p.66.

142. Ibid p.67.

143. Wilson J. (1812) op cit p.143.

144. Belsches R. (1796) op cit p.46.

145. Ibid p.47.

146. Ibid.

147. O.S.A. Fenwick Vol.XIV (1795) p.54; Kirkoswald Vol.X (1794) p.491; Kirkmichael Vol.VI(1793) p.105.

148. O.S.A. Stair Vol.VI (1793) p.113-4; Tarbolton Vol.XIX (1797) p.455.

149. N.S.A. Vol.VIII (1845) Campsie p.251-2; Kilsyth p.157.

150. N.S.A. Vol.VIII (1845) New Kilpatrick p.56.

151. N.S.A. Vol.VIII (1845) Cumbernauld p.150.

152. N.S.A. Vol.VI (1845) Cambuslang p.436.

153. N.S.A. Vol.VIII (1845) Old Kilpatrick p.25.

154. N.S.A. Vol.VII (1845) Kilbarchan p.374; Eaglesham p.400.

155. N.S.A. Vol.VI (1845) East Kilbride p.897; Vol.VII (1845) Nearns p.523.

156. N.S.A. Vol.VII (1845) Paisley p.258.

157. N.S.A. Vol.VI (1845) Hamilton p.280.

158. N.S.A. Vol.VI (1845) Cadder p.410.

159. N.S.A. Vol.VI (1845) Cambuslang p.436.

160. Sturrock A. (1866-7) op cit p.81.

161. Ibid p.82.

162. Ibid p.83.

163. Sinclair J. (1814) op cit Vol.III p.56; Vol.V p.179

164. Ibid. Vol.V p.179.

165. Ibid.

166. Ure D. (1794) op cit p.59.

167. Whyte A. & Macfarlan D. (1811) op cit p.221; Belsches R. (1796) op cit p.47-8.

168. Naismith J. (1813) op cit p.129.

169. Aiton W. (1811) op cit p.445.

170. Ibid p.445-6.

171. Smith J. (1813) op cit p.244.

172. O.S.A. Cathcart Vol.V (1793) p.343.

173. O.S.A.Eaglesham Vol.II (1792) p.118.

174. O.S.A. East Monkland Vol.VII (1793) p.271.

175. O.S.A. Neilston Vol.II (1792) p.152.

176. Whetham E. Prices & Production in Scottish Farming 1850-70 p.241

177. Ibid. p.242.

178. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.14.

179. Prothero R.E. (Lord Ernle) (1961) op cit p.381; Chambers J.D. & Mingay G.E. (1966) op cit p.184-5.

180. Ibid p.353.

181. N.S.A. Vol.VI (1845) Cambuslang p.436.

182. N.S.A. Vol.VI (1845) EastKilbride p.896; Report on the Present State of Agriculture in Scotland H.A.S.S. 1878.

183. Aiton W. (1811) op cit p.444. Sinclair J.(1813)op cit Vol.p117

184. Ibid. P.443.

185. Ibid p.442 e.g. O.S.A. Fenwick VolXV (1795) p.54. Dairy Farmers sold calves to butchers in season at considerable prices for Glasgow & Irvine.

186. Ibid p.443 In Stonehouse, where veal production was important dairying was also mentioned , so one activity was not practiced exclusively, O.S.A. Vol.II (1792) Stonehouse p.224. Similarly in Dalserf calf-rearing was practised along with the making of butter and cheese O.S.A. Dalserf Vol.II (1792) p.378.

187. Aiton W. (1812) op cit p.186.

B. Beef Cattle

1. Aiton W. (1816) op cit p.168
2. Watson J.A.S. & More J.A. (1944) op cit p.775.
3. Ibid P.775; p.768.
4. Fullarton W. (1793) op cit p.57.
5. Ure D. (1794) op cit p.60.
6. Naismith J. (1798) op cit p.93.
7. Ibid.
8. Belsches R. (1796) op cit p.45.
9. Naismith J. (1794) op cit p.70; Ure D. (1794) op cit p.61.
10. Naismith J. (1794) op cit p.69; Ure D. (1794) op cit p.60.
11. Robson J. (1794) op cit p.12; p.21.
12. Ibid p.31.
13. Ibid P.28.
14. O.S.A. Kildalton Vol.XI (1794) p.287.
15. O.S.A. Lismore & Appin Vol.I (1791) p.488; Luss Vol.XVII (1796) p.259.
16. O.S.A. North Knapdale Vol.VI (1793) p.262-3; SRO RHP 972/5
17. O.S.A. Kilmorie Vol.IX (1793) p.169; Kingarth Vol.I (1791) p.309; Kilbride Vol.VIII (1793) p.578.
18. O.S.A. Kingarth Vol.I (1791) p.309.
19. O.S.A. Kilchonan Vol.XI (1794) p.278.
20. The Book of the Thanes of Cawdor, Spalding Club 1859 p.351.
21. O.S.A. Kilchonan Vol.XI (1794) p.278.
22. O.S.A. Kalarrow Vol.XI (1794) p.300: Heron R. (1794) op cit p.38.
23. O.S.A. Lochgoilhead Vol.III (1792) p176-7.
24. Ibid p.177.
25. O.S.A. Ardchattan Vol.VI (1793) p.177.
26. O.S.A. Bonhill Vol.III (1792) p.451; New Kilpatrick Vol. VII (1793) p.102.

27. O.S.A. Girvan Vol.XII (1794) p.341
28. O.S.A. Dailly Vol.X (1794) p.39
29. Ibid p.40.
30. O.S.A. Ballantrae Vol.I (1791) p.107.
31. Ibid.
32. O.S.A. Barr Vol.XII (1794) p.84; Girvan Vol.XII (1794) p.341; West Kilbride Vol.XII (1794) p.411.
33. O.S.A. Kirkmichael Vol.VI (1793) p.105.
34. O.S.A. Gigha & Cara Vol.VIII (1794) p.50 .
35. O.S.A. Campbeltown Vol.X (1794) p.549; Jura Vol.XII (1794) p.321; Kilfinan Vol.XIV (1795) p.241.
36. O.S.A. Buchanan Vol.1X (1793) p.19.
37. O.S.A. Fintry Vol.XI (1794) p.374; Campsie Vol.XV (1795) p.346.
38. O.S.A. Colonsay Vol.XII (1794) p.329 Kilchrenan Vol.VI (1793) p.269; Glenorchy Vol.VIII (1793) p.339.
39. O.S.A. Tiree Vol.X (1794) p.411.
40. O.S.A. Inverary Vol.V (1793) p.299-300.
41. O.S.A. Old Kilpatrick Vol.V (1793) p.233.
42. O.S.A. Houston & Killallan Vol.I (1791) p.324.
43. O.S.A. Kilbarchan Vol.XV (1795) p.502; Neilson Vol.II (1792) p.152.
44. O.S.A. Greenock Vol.V (1793) p.566.
45. O.S.A. Dalry Vol.XIII (1794) p.65
46. O.S.A. Largs Vol.XVII (1796) p.504.
47. O.S.A. Dalserf Vo.III (1792) p.375.
48. e.g. O.S.A. Neilston Vol.II (1792) p.152; Lochwinnoch Vol. XV (1795) p.74. Mearns Vol.XVII (1796) p.306; Eaglesham Vol.II (1792) p.123.
49. O.S.A. Kilsyth Vol.XVIII (1796) p.280: Campsie Vol.XV (1795) p.344.
50. O.S.A. Strathblane Vol.XVIII (1796) p.568.
51. Ibid. p.569.
52. O.S.A. Kippen Vol.XVIII (1796) p.346.
53. O.S.A. Symington Vol.V (1793) p.399.
54. O.S.A. Dundonald Vol.VII (1793) p.622; Kirkoswald Vol.X (1794) p.491.
55. O.S.A. Hamilton Vol.II (1792) p.190.
56. O.S.A. Kilfinichan Vol.XIV (1795) p.191-2; Dunoon Vol.II (1792) p.391; Arrochar Vol.III (1792) p.431; Inverchaolain Vol.V (1793) p.468.
57. O.S.A. Killearn Vol.XVI (1795) p.115; Campsie Vol.XV (1795) p.345; Fintry Vol.XI (1794) p.374-5.

58. O.S.A. Fintry Vol.XI (1794) p.375.

59. O.S.A. Culter Vol.VI (1793) p.78; Crawfordjohn Vol.VI (1793) p.275.

60. O.S.A. Dunsyre Vol.I (1791) p.339.

61. Smith J. (1813) op cit p.240.

62. Ibid.

63. Ibid p.253.

64. Ayton R.A. Voyage Round Great Britain, Summer 1813 Vol.III p.45 and 63.

65. Whyte A. & Macfarlan D. (1811) op cit p.210.

66. Ibid p.211.

67. Ibid p.213-4.

68. Aiton W. (1816) op cit p.281.

69. Naismith J. (1813) op cit p.130.

70. Graham P. (1812) op cit p.282-3.

71. Ibid. p.287.

72. Ibid.

73. Ibid p.288.

74. Wilson J. (1812) op cit p.146.

75. Aiton W. (1811) op cit p.415.

76. N.S.A. Vol.VII (1845) Ardchattan p.503.

77. N.S.A. Vol.VII (1845) Glenorchy p.99.

78. N.S.A. Vol.VII (1845) Jura p.541.

79. N.S.A. Vol.VII (1845) Tiree p.213.

80. N.S.A. VOl.V (1845) Cumbray p.77; Kingarth p.91; Rothesay p.108.

81. N.S.A. Vol.V (1845) Kilbride p.29; Kilmorie p.47.

82. N.S.A. Vol.VIII (1845) Roseneath p.124; O. Kilpatrick p.25; New Kilpatrick p.55.

83. N.S.A. Vol.VIII (1845) Cardross p.90; Rhu p.77.

84. N.S.A. Vol.VIII (1845) Arrochar p.98; Luss p.164; Kilmaronockp.211 .

85. e.g. N.S.A. Vol.VI (1845) Lesmahagow P.36; Carnwath p.87; Hamilton p.280.

86. N.S.A. Vol.VI (1845) Douglas p.486; Cambuslang p.435.

87. N.S.A. Vol.VI (1845) Dolphinton p.59.

88. N.S.A. Vol.VI (1845) Cambusnethan p.622.

89. N.S.A. Vol.VIII (1845) Campsie p.252; Fintry p.45.

90. N.S.A. Vol.VIII (1845) Killearn p.69; Kilsyth p.157; Strathblane p.85.

91. N.S.A. Vol.VIII (1845) Falkirk p.14; p.17; p.21.

92. N.S.A. Vol.V (1845) Barr p.411. In the 1790's only black cattle were mentioned. O.S.A. Vol.XII (1794) p.84.

93. N.S.A. Vol.V (1845) Colmonell p.530-1.

94. N.S.A. Vol.V (1845) Coylton p.657; Dailly p.386; Dalmellington p.317; Dunlop p.302; Ochiltree p.113.

95. N.S.A. Vol.V (1845) Maybole p.370-1; St.Quivox p.121.

96. N.S.A. Vol.V (1845) Straiton p.341.

97. N.S.A. Vol.VII (1845) Lochwinnoch p.112.

98. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.12.

99. See table. Figures obtained from Highland & Agricultural Society Census & Parliamentary Papers

100. Parliamentary Papers 1867 (3941) LXXl 125, 1869 (4200) LXll 507.

101. Parliamentary Papers 1873 c878 LXlX 301; 1874 c1033 LXlX 627.

102. One Mr. Dick, a graduate in vetinary science, began lecturing to country farriers in c1824.

103.

C. Work Oxen

1. Sinclair J. (1814) op cit Vol.III p.77.

2. Whyte I.D. Agriculture & Society in Seventeenth Century Scotland 1979 Chapter 3. Sinclair J. (1814) op cit Vol. III p.77.

3. Sinclair J. (1813) op cit Vol.I p.120.

4. Fullarton W. (1793) op cit p.57; Sinclair J. (1814) op cit p.203.

5. Sinclair J. (1813) op cit Vol.I p.119-123; Vol.II p.79-82.

6. Fullarton W. (1793) op cit p.57; Graham P. (1812) op cit p.290.

7. Whyte A. & Macfarlan D. (1811) op cit p.222.

8. Ibid.

9. Naismith J. (1798) op cit p.122.

10. O.S.A. Lanark Vol.XV (1795) p.18.

11. Sinclair J. (1814) op cit Vol.III p.78.

CHAPTER X

Sheep

1. Sinclair J (1814) op cit Vol.III p.109.

2. Ibid.

3. Ryder M.L. The Evolution of Scottish Breeds of Sheep. Scottish : Stud. 12, 1968 p.127.
4. Sinclair J. (1814) op cit Vol.III p.109.
5. Ibid p.113-4.
6. Ibid p.116.
7. Ibid.
8. Ibid. p.119.
9. Ibid.
10. Ibid p.123.
11. Ibid p.121.
12. Watson J.A.S. & More J.A.(1944) op cit p.591.
13. Sinclair J. (1814) op cit Vol.III P.120 p.123.
14. Ibid p.143.
15. Ibid p.143-4.
16. Handley J.E. Scottish Farming in The Eighteenth Century 1963. p.73.
17. Sinclair J. (1814) op cit Vol.III p.117. He recommends 21½ quarts tar +2 stone butter for 50 lambs, or 21½ quarts tar +33 lbs for 80 older sheep.
18. Handley J. E. (1963) op cit p.73; Smith J. (1813) op cit p.265.
19. Smith J. (1813) op cit p.265.
20. Whyte A. & Macfarlan D. (1811) op cit p.228.
21. Aiton W. (1811) op cit p.477.
22. Naismith J. (1798) op cit p.121.
23. Aiton W. (1811) op cit p.486.
24. O.S.A. Strathblane Vol.XVIII (1796) p.570.
25. Robson J. (1794) op cit p.9.
26. O.S.A. Lochgoilhead Vol.III (1792) p.179.
27. Smith J. (1813) op cit p.265.
28. Ure D. (1794) op cit p.65.
29. Whyte A. & Macfarlan D. (1811) op cit p.226.
30. Graham P. (1812) op cit p.295.
31. Ibid.
32. Ibid.
33. Ure D. (1794) op cit p.65.
34. Whyte D. & Macfarlan A. (1811) op cit p.226.
35. O.S.A. Luss Vol.XVII (1796) p.263.
36. Aiton W. (1811) op cit p.486.
37. The Farmers' Register, April 1827. Vol.I, No.IV p.156.
38. e.g. Remarks on the Smearing of Sheep. T. Harkness T.H.A.S.S. New Series Vol.IV. No. XII p.125-29.

39. Sinclair J. (1814) op cit Vol.III p.147.
40. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.16; Watson J.A.S. & More J.A. (1944) op cit p.607, 610.
41. Sinclair J. (1814) op cit Vol.III p.124.
42. Ibid p.124-136.
43. Ibid p.136-143.
44. Ibid p.118.
45. Ure D. (1794) op cit p.63.
46. Robson J. (1794) op cit p.8.
47. Smith J. (1813) op cit p.256.
48. Ibid.
49. Ibid; Robson J. (1794) op cit p.28.
50. Robson J. (1794) op cit p.28.
51. Ibid p.29.
52. Grant K.W. (1919) op cit p.147.
53. O.S.A. Kilninver & Kilmelfort Vol.X (1794) p.319.
54. O.S.A. Kilninian Vol.XIV(1795) p.145; Glassary Vol.XIII (1794) p.660.
55. Robson J. (1794) op cit p.20.
56. O.S.A. Killean & Kilchenzie Vol.XIX (1797) p.630-1.
57. O.S.A. Jura & Colonsay Vol.XII (1794) p.320.
58. O.S.A. Lochgoilhead & Kilmorich Vol.III (1792) p.178; 180.
59. O.S.A. North Knapdale Vol.VI (1793) p.261.
60. Headrick J. (1807) op cit p.322.
61. Ibid p.323.
62. Aiton W. (1816) op cit p.303-5.
63. Fullarton W. (1793) op cit p.61; Aiton W. (1811) op cit p.480.
64. O.S.A. Kilwinning Vol.XI (1794) p.151.
65. O.S.A. Lamington Vol.VI. (1793) p.552.
66. Ure D. (1793) op cit p.63.
67. Robson J. (1794) op cit p.8; p.10; p.31.
68. O.S.A. Kilimalie Vol.VIII (1793) p.424.
69. O.S.A. Kilmartin Vol.VIII (1793) p.102; Kilmore & Kilbride Vol.XI (1794) p.128.
70. O.S.A. Lismore & Appin Vol.I (1791) p.488.
71. O.S.A. Lochgoilhead & Kilmorich Vol.III (1792) p.177-78.
72. Ibid p.179-80.
73. O.S.A. Strachur & Stralachlan Vol.IV (1792) p.574-5.
74. O.S.A. Dunoon Vol.II (1792) p.391.
75. O.S.A. Glenorchy & Inishail Vol.VIII (1793) p.338.
76. Ibid p.339.
77. O.S.A. Tiree Vol.X (1794) p.410.

78. Ibid.

79. O.S.A. Kilchonan Vol.XI (1794) p.279.

80. O.S.A. Kildalton Vol.XI (1794) p.292.

81. Naismith J. (1798) op cit p.120-1.

82. Heron R. Scotland Described (1797) p.166.

83. O.S.A. Carnwath Vol.X (1794) p.330;Culter Vol.VI (1793) p.78.

84. O.S.A. Crawfordjohn Vol.VI (1793) p.275; Avondale Vol.XI (1794) p.386.

85. O.S.A. Lesmahagow Vol.VII (1793) p.426; Douglas Vol.VIII (1793) p.81; Carmichael Vol.XIII (1794) p.370. Dolphinton Vol.XIV (1795) p.109.

86. Aiton W.(1811) op cit p.476.

87. Ibid p.477.

88. Heron R. (1797) op cit p.150.

89. O.S.A. Galston Vol.II (1792) p.74. Sorn Vol.XX (1798)p.150, Dalry Vol.XII (1794) p.98; Largs Vol.XVII (1796) p.509. Fenwick Vol.XIV (1795) p.54.

90. O.S.A. Straiton Vol.III (1793) p.588. Ochiltree Vol.V (1793) p.447; Ballantrae Vol.I (1791) p.105, 107-8; Auchinleck Vol.XI (1794) p.432.

91. O.S.A. Barr Vol. XII (1794) p.85.

92. O.S.A. Dundonald Vol.VII (1793) p.622. Girvan Vol.XII (1794) p.341; Colmonell Vol.II (1792) p.61; Innerkip Vol.IX (1793) p.97.

93. Ure D. (1794) op cit p.63.

94. Ibid.

95. Whyte A. & Macfarlan D. (1811) op cit p.223.

96. Heron R. (1797) op cit p.193.

97. Ibid p.184.

98. O.S.A. Old Kilpatrick Vol.V (1793) p.233; Arrochar Vol. III (1792) p.431.

99. O.S.A. Rhu Vol.IV (1792) p.406; Luss Vol.XVII (1796) p.259.

100. Wilson J. (1812) op cit p.147.

101. Belsches R. (1796) op cit p.49.

102. Graham P. (1812) op cit p.293.

103. O.S.A. Strathblane Vol.XVIII (1796) p.569.

104. O.S.A. Fintry Vol.XI (1794) p.375-6.

105. O.S.A. Killearn Vol.XVI (1795) p.114.

106. Ure D. (1794) op cit p.66.

107. Ibid.

108. Naismith J. (1794) op cit p.69.

109. Naismith J. (1798) op cit p.120. (1813) op cit p.130.

110. O.S.A. West Monkland Vol.VII (1793) p.379; Dalserf Vol.II (1793) p375.

111. O.S.A. Houston Vol.I (1791) p.324. Sorn Vol.XX (1798) p.150; Avondale Vol.IX (1793) p.386; Dalry Vol.XII (1794) p.98.

112. Martin A. (1794) op cit p.15-16.

113. Robertson G. (1829) op cit p.576.

114. Ibid; O.S.A. Stevenston Vol.VII (1793) p.28.

115. O.S.A. Dalziel Vol.III (1792) p.463; Hamilton Vol.II (1792) p184.

116. O.S.A. Kilmarnock Vol.III (1792) p.99; Kirkmichael Vol. VI (1793) p.106; Cragie Vol.V (1793) p.372.

117. O.S.A. Symington Vol.V (1793) p.399.

118. O.S.A. Blantyre Vol.II (1792) p.218. Cardross Vol.XVII (1796) p.212; Bonhill Vol.III (1792) p.451; New Kilpatrick Vol.VII (1793) p.102.

119. O.S.A. Govan Vol.XIV (1795) p.288.

120. O.S.A. Kilbarchan Vol.XV (1795) p.502; Eastwood Vol. XVIII (1796) p.201; Kilmacolm Vol.IV (1792) p.276.

121. O.S.A. Glenorchy Vol.VIII (1793) p.339; Iverchaolain Vol.V (1793) p.467.

122. Aiton W. (1816) op cit p.305.

123. Robson J. (1794) op cit p.33; p.20.

124. O.S.A. Gargunnock Vol.XVIII (1796) p.92.

125. O.S.A. Inveraray Vol.V (1793) p.300.

126. O.S.A. Cambuslang Vol.V (1793) p.263.

127. O.S.A. Barr Vol.XII (1794) p.85-86, Girvan Vol.XII (1794) p.341.

128. O.S.A. Colmonell Vol.II (1792) p.61; West Kilbride Vol. XII (1794) p.411.

129. O.S.A. Largs Vol.XVII (1796) p.509.

130. O.S.A. Dailly Vol.X (1794) p.40-41.

131. O.S.A. Galston Vol.II (1792) p.74; Fenwick Vol.XIV (1795) p.54.

132. O.S.A. Dundonald Vol.VII (1793) p.622.

133. O.S.A. Killearn Vol.XVI (1795) p.115; Strathblane Vol.XVIII (1796) p.571.

134. Robson J. (1794) op cit p.20.

135. Macnab P.A. The Isle of Mull 1870 p.83.

136. Ibid p.84.

137. Smith J. (1813) op cit p.258-9; p.262.

138. Sinclair J. (1814) op cit Vol.III p.116.

139. Ure D. (1794) op cit p.63.

140. N.S.A. Vol.VII (1845) Kilchonan p.654.

141. N.S.A. Vo4.VI (1845) Blantyre p.322; Dalserf p.743; Dalziel p.456; Pettinain p.541.

142. N.S.A. Vol.VIII (1845) St.Ninians p.328; Muiravonside p.212.

143. N.S.A. Vol.V (1845) Stair p.645; Riccarton p.612; Vol.VIII (1845) Roseneath p.124.

144. N.S.A. Vol.VI (1845) Crawford p.333; Wandell & Lammington p.830.

145. N.S.A. Vol.VI (1845) Dunsyre p.71; Libberton p.45.

146. N.S.A. Vol.VI (1845) Carnwath p.88; Crawfordjohn p.507.

147. N.S.A. Vol.VII (1845) Paisley p.258; Neilston p.333.

148. N.S.A. Vol.VIII (1845) Drymen p.109; Logie p.229.

149. N.S.A. Vol.V. (1845) Kilmorie p.46-7.

150. N.S.A. Vol.VII (1845) Southend p.432.

151. N.S.A. Vol.V (1845) Ayr. p.50.

152. N.S.A. Vol.V (1845) Coylton p.657; Dailly p.386.

153. N.S.A. Vol.V (1845) Dalry p.225; Symington p.568; Kilbirnie p.712.

154. N.S.A. Vol.V (1845) Dreghorn p.526; Kilwinning p.828.

155. N.S.A. Vol.V (1845) Kirkoswald p.785; St.Quivox p.121.

156. N.S.A. Vol.V (1845) Kilbride p.29.

157. N.S.A. Vol.VI (1845) Wandell p.828; Wiston p.97; Crawfordjohn p.507; Lesmahagow p.36; Dolphinton p.59; Douglas p.486. Culter p.348.

158. N.S.A. Vol.VII (1845) Eaglesham p.400; Kilmacolm p.59.

159. N.S.A. Vol.VIII (1845) Balfron p.297; Drymen p.109; Buchanan p.97.

160. N.S.A. Vol.VIII (1845) Buchanan p.97.

161. N.S.A. Vol.V (1845) Colmonell p.530; Kilmarnock p.545.

162. N.S.A. Vol.V (1845) Dalry p.225; Symington p.568; Kilbirnie p.712; Vol.VII (1845) Greenock p.432.

163. N.S.A. Vol.VII (1845) Renfrew p.22.

164. N.S.A. Vol.VII (1845) Ardchatton p.503; Gigha p.403; Kilninian p.344.

165. N.S.A. Vol.VII (1845) Kilfinichen p.309.

166. N.S.A. Vol.VII (1845) Graignish p.56; Dunoon p.615; Kilmartin p.563; Glenorchy p.99.

167. N.S.A. Vol.VII (1845) Inverchaolain p.113; Lismore & Appin p.246.

168. N.S.A. Vol.VII (1845) Tiree p.213; Jura p.541.

169. N.S.A. Vol.VII (1845) Morvern p.188.

170. N.S.A. Vol.VIII (1845) Luss p.164; Rhu p.78.

171. N.S.A. Vol.VIII (1845) Kilmar onock p.216.

172. N.S.A. Vol.VIII (1845) Old Kilpatrick p.25; New Kilpatrick p.54; Arrocher p.98.

173. Highland & Agricultural Society Census 1954 and 1855.

174. Parliamentary Papers 1867 (3941) LXXl 125 Agricultural Statistics p.4

175. Parliamentary Papers 1869 (4200) LXll 507 Agricultural Statistics p.9.

176. Parliamentary Papers 1871 c460 LXlX 271 p.3; 1872 c675 LXlll 675 p.3.; 1873 C878 LXlX 301 p.12

177. Report on the Present State of the Agriculture of Scotland T.H.A.S.S. (1878)p.194;

178. Prothers R.E. (lord Ernle) (1961) op cit p.189; p.381

179. Ibid p.381.

Agricultural Horses

1. Sinclair J. (1814) op cit Vol.III p.175.

2. Ibid p.174-5.

3. Ibid p.175.

4. Ibid p.180.

5. Ibid.

6. Fullarton W. (1793) op cit p.53.

7. Ibid p.56.

8. O.S.A. Kirkoswald Vol.X (1794) p.491.

9. O.S.A. Kirkmichael Vol.VI (1793) p.105.

10. O.S.A. Lismore & Appin Vol.I (1791) p.488; Lochgoilhead Vol.III (1792) p.176.

11. O.S.A. Dundonald Vol.VII (1793) p.622; Kilmaurs Vol.IX (1793) p.359.

12. O.S.A. Carmunnock Vol.XVIII (1796) p.163; Kippen Vol. XVIII (1796) p.346.

13. O.S.A. Kilbarchan Vol.XV (1795) p.501.

14. O.S.A. Killearn Vol. XVI (1795) p.115.

15. O.S.A. East Monkland Vol.VII (1793) p.271; Bothwell Vol.XVI (1795) p.312; Lasmahagow Vol.VII (1793) p.426; Culter Vol.VI (1793) p.78.

16. Naismith J. (1798) op cit p.122.

17. Ure D. (1794) op cit p.58;Belsches R. (1796) op cit p.43.

18. O.S.A. Cambuslang Vol.V (1793) p.262.

19. O.S.A. Luss Vol.X VII (1796) p.259; Dalry Vol.XII (1794) p.100.

20. O.S.A. Kilmaurs Vol.IX (1793) p.359.

21. O.S.A. Kilwinning Vol.XI (1794) p.158.
22. O.S.A. Kingarth Vol.I (1791) p.309; Kilmorie Vol.IX (1793) p.169.
23. Headrick J. (1807) op cit p.318.
24. Ibid.
25. O.S.A. Hamilton Vol.II (1792) p.183.
26. O.S.A. Kilfinichen & Kilviceuen Vol.XIV (1795) p.191.
27. O.S.A. Kilmalie Vol.VIII (1793) p.434.
28. O.S.A. Eaglesham Vol.II (1792) p.123.
29. O.S.A. Tiree Vol.X (1794) p.411-2.
30. O.S.A. Kilchonan Vol.XI (1794) p.279.
31. O.S.A. Jura Vol.XII (1794) p.321. Kilfinichen & Kilviceuen Vol.XIV (1795) p.191.
32. O.S.A. Kilfinan Vol. XIV (1795) p.254; Kilmore & Kilbride Vol.XI (1794) p.128.
33. O.S.A. Lochwinnoch Vol.XV (1795) p.73; Old Kilpatrick Vol.V (1793) p.233. Cardross Vol.XVII (1796) p.212; West Kilbride Vol.XII (1794) p.412.
34. O.S.A. Craigie Vol.V (1793) p.372.
35. O.S.A. Sorn Vol.XX (1798) p.150.
36. O.S.A. Stair Vol.VI (1793) p.114.
37. O.S.A. Largs Vol.II (1792) p.361.
38. O.S.A. Symington Vol.V (1793) p.398.
39. Belsches R. (1796) op cit p.43-4.
40. O.S.A. East Monkland Vol.VII (1793) p.271; Kilbarchan Vol.XV (1795) p.501; Kilmalie Vol.VIII (1793) p.424.
41. O.S.A. Campsie Vol.XV (1795) p.340.
42. O.S.A. Kilchonan Vol.XI (1794) p.279; Eaglesham Vol.II (1792) p.123.
43. O.S.A. Govan Vol.XIV (1795) p.287-8.
44. O.S.A. Kilsyth Vol.XVIII (1796) p.280.
45. Aiton W. (1816) op cit p.306.
46. Ibid.
47. Smith J. (1813) op cit p.283.
48. Whyte A. & Macfarlan D. (1811) op cit p.233.
49. Ibid p.234.
50. Ibid p.240.
51. Ibid p.235.
52. Wilson J. (1812) op cit p.154-5; Graham P. (1812) op cit p.300.
53. Aiton W. (1811) op cit p.495.

54. Ibid p.496-7.

55. Ibid p.502.

56. N.S.A. Vol.VII (1845) Renfrew p.22; Paisley p.257; Kilbarchan p.374.

57. N.S.A. Vol.VII (1845) Erskine p.519; Inchinnan p.127; Vol VIII (1845) Old Kilpatrick p.24.

58. N.S.A. Vol.VIII (1845) Kirkintilloch p.198; Cardross p.90; Vol.V (1845) Kilmorie p.46; Vol.VII (1845) Inverchaolain p.114.

59. N.S.A. Vol.VIII (1845) Cardross p.90; Cumbernauld p.150.

60. N.S.A. Vol.VI (1845) Shotts p.630.

61. N.S.A. Vol.VIII (1845) Drymen p.109.

62. N.S.A. Vol.VI (1845) Shotts p 630.

63. N.S.A. Vol.VI (1845) Avondale p.303; Vol.VIII (1845) Bothkennar p.202.

64. N.S.A. Vol.VII (1845) Eaglesham p.400.

65. N.S.A. Vol.VI (1845) Cambuslang p.435; Dalziel p.456.

66. N.S.A. Vol.VII (1845) Ardchattan p.503; Craignish p.56.

67. N.S.A. Vol.VI (1845) Crawfordjohn p.511; Carmunnock p.604.

68. N.S.A. Vol.IV(1845) Crawfordjohn p.511.

69. N.S.A. Vol.VII (1845) Jura p.540; Ardnamuchan p.151.

70. N.S.A. Vol.VII (1845) Dunoon p.588.

71. N.S.A. Vol.VII (1845) Glassary p.690.

72. N.S.A. Vol.V (1845) Girvan p.400.

73. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.17.

74. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7. Parliamentary Papers 1870 c223 LXVIII 363.

Pigs

1. Watson J.A.S. & More J.A. (1944) op cit p.647.

2. Naismith J. (1798) op cit p.124.

3. Whyte I.D. (1979) op cit Chapter 3.

4. Extracts from the burgh records of Lanark, Scottish Burgh Hist. Soc. 1893 p.125.

5. Naismith J. (1798) op cit p.124-5.

6. O.S.A. Cadder Vol.VIII (1793) p.483; Symington Vol. VIII (1793) p.589.

7. O.S.A. Lesmahagow Vol.VII (1793) p.426.

8. O.S.A. East Kilbride Vol. III (1792) p.434-4; Avondale Vol.IX (1793) p.385.

9. O.S.A. Lanark Vol. XV (1795) p.33.

10. Fullarton W. (1793) op cit p.53.
11. Belsches R. (1796) op cit p.51.
12. O.S.A. Kilsyth Vol.XVIII (1796) p.280.
13. O.S.A. Kilfinan Vol.XIV (1795) p.255; Heron R. (1794) op cit p.49.
14. O.S.A. Gigha & Cara Vol.XV (1795) p.51.
15. O.S.A. Ardchattan & Muckairn Vol.V (1793) p.177.
16. O.S.A. Kilmore & Kilbride Vol.XI (1794) p.128.
17. O.S.A. Lochwinnoch Vol.XV (1695) p.74.
18. O.S.A. Kilbarchan Vol.XV (1795) p.502.
19. Smith J. (1813) op cit p.286.
20. Aiton W. (1811) op cit p.506.
21. Diary of Henry Richmond of East Montgarswood, Som in On An Ayrshire Farm, 1823-24 John Strawhorn 1824 p.58.
22. Whyte A. & Macfarlan D. (1811) op cit p.242.
23. Ibid.
24. Graham P (1812) op cit p.302.
25. Ibid p.303.
26. Wilson J. (1812) op cit p.156.
27. Aiton W. (1816) op cit p.309.
28. N.S.A. Vol.VII (1845) Neilston p.319; Vol.VI(1845) Lesmahagow p.36.
29. N.S.A. Vol.VI (1845) Douglas p.486.
30. N.S.A. Vol. VI(1845) Dalserf p.743; Bothwell p.795; Blantyre p.322.
31. N.S.A. Vol.V (1845) Craigie p.767; Dunlop p.300; Dalry p.226; Colmonell p.530.
32. N.S.A. Vol.V (1845) Dalry p.226, Dunlop p.299; Kilbirnie p.712; West Kilbride p.261.
33. N.S.A. Vol.V (1845) Girvan p.400.
34. N.S.A. Vol.V (1845) Largs p.803; Kilmarnock p.550; Stewarton p.736; Ochiltree p.113; Stevenston p.463.
35. N.S.A. Vol.V (1845) Symington p.568.
36. N.S.A. Vol.VII (1845) Invarary p.30.
37. N.S.A. Vol.VII (1845) Tiree p.213.
38. N.S.A. Vol.V (1845) Kilbride p.31.
39. Sturrock A. (1866-7) op cit p.87.
40. Ibid.
41. Ibid.
42. Irving G.V.I. & Murray A. (1864) op cit Vol.III p.17.
43. Ibid.

44. Highland & Agricultural Society Census 1854 p.6; 1855 p.5; 1856 p.9; 1857 p.7.

45. Parliamentary Papers 1866 3727 LXl.

46. Parliamentary Papers 1868 (4057) LXX 125; 1870 c223 LXVIII 363; 1872 c675 LXlll 675.

47. Parliamentary Papers 1874 c1033 LXlX 627.

48. Parliamentary Papers 1867 (3941) LXXl 125; 1868 (4057) LXXl25.

49. Parliamentary Papers 1873 c878 LXlX 301.

50. Prothero R.E. (lord Ernle) (1961) op cit p.510.

APPENDIX 2

TERMINOLOGY

AHA Sunken fence, 3' high faced with thin stones covered 1" or 2" with clean good earth on which thorns are laid, and covered with more earth, then 1' of stone with small cape of sod.

Martin A. (1794) op.cit. p.13.

AIREACH Hersdman, only man who went with women to shielings.

p.150. K.W. Grant S.H.R. 16 1919

AIRIGH (Ah-ry) Green grassy hill. Used as summer pasture, when lower ground exhausted.

p.150. K.W. Grant S.H.R. 16 1919

ALGA MARINA Sea ware, used as manure.

Killean & Kilchenzie p.389 N.S.A. Argyle Vol.VII

ALTERNATE HUSBANDRY The practice of arable farming for fodder crops.

Chambers J.D. & Mingay G.E. (1967) op.cit. p.4

AWAL LAY CROP Second crop of three on outfield after breaking up. Best of three crops taken from outfield, because land is less stiff than with first crop, and less exhausted than with third

p.45 Ure D. 1794 op.cit. see Layawal Crop

BAULKS Narrow strips of grass between ridges.

p.28 Belsches R. 1796 op.cit.

BEAR PEASE Giving a crop of pease the same pains, manure, and attention that is usually bestowed on barley. Used as means of bringing in weedy, poor or worn out ground in Kilmarnock part of Ayrshire.

Kilmarnock O.S.A. Vol.II (1792) p.102.

BELTAN(E) 1st or 3rd May. One of ancient quarter days viz Hallowmas, Candlemas, Beltane and Lammas. Also 8th May.

S.N.D.

BENGALS Cloth with linen warp and cotton weft.

O.S.A. Killearn p.118 Vol.XVI (1795)

BIGGINS Houses.

O.S.A. Kilmartin p.98 Vol.VIII (1793)

BINGS Long heaps used for storing potatoes. Usually 6' wide and 3-4' high. Heap is covered with sod, grassy side being laid close to potatoes, and whole covered with earth.

Whyte A. & Macfarlan D. (1811) op.cit. p.126

BINK Place or bank where peats are cast.

p.94 URE D. (1794) op.cit.

BONDAGER Female outworker - provided 18 days unpaid help at harvent (victuals for her and husband given in lieu of rent). System lasted until 1850s, but remnants still found in 20th Century.

Symon J. (1959) op.cit. p.160

BONE Narrow ridge where weeds, stones and rubbish accumulated; Baulk.

N.S.A. Kilmorie Vol.V (1845) p.61.

BOOING Letting of cows. Farmers bind themselves to give reasonable supply of food in summer and winter, and in return get £6 10s - £8 per cow. Practice is spreading. Owners are relieved of care of cows while booers get a share in the management.

Girven N.S.A. Vol.V (1845) p.400.

BOTHY Simple accommodation provided for agricultural labourers where they could cook, dine, sit and sleep. Common in eastern arable areas - chiefly confined to area between north of Forth and Howe of Mearns, but also used on some of larger farms in Moray and Aberdeen. Conditions were very poor and were remarked upon by Cobbett for their extreme squalor.

Symon J. (1959) op.cit. p.159-61.

(1) BOYN; (2) BOYEN

Milk pail.

(1) Papers Relating to a Renfrewshire Farm 1822-30 G. Pryde op.cit. p.158

(2) Rural Recollections G. Robertson (1829) op.cit. p.558

BRAXY Disease of sheep, often fatal in period of study. Found mostly among lambs and hogs, from October to November onwards.

Sinclair J. (1814) op.cit. Vol.III p.155.

BREAKE Heavy harrow, used for tearing up obstinate weeds. Generally triangular with long stout teeth.

Graham P. (1812) op.cit. p.110

BUGHT Sheep pen where animals were put at night. Had slits in walls to admit air, and was closed with hurdle door. Inside was rack filled with pease-straw or soft hay, and at night with a little unthreshed peas or oats. Floor littered with dry straw or turfs.

O.S.A. Hamilton (1792) Vol.II p.184

BUTTS Crofts; local name. Few acres arable with grass for 2-4 cows, without any enclosure but a nominal line of march between himself and rest of farm.

O.S.A. Kilfinian (1795) Vol.XIV p.242

CADGES Bundles in equipage. Applied to straw.

Rural Recollections (1829) op.cit. George Robertson p.557

CAIMELEID Softer cloth than temin, but with as fine a texture. Dyed in the web, and dressed to have nap on cloth.

K.W. Grant S.H.R. p.148 16 1919

CAPE & RICKLE Course of flat stones projecting a little over dry stone wall on each side and covered with small stones, loose or laid on their edges, the whole being about 1' high.

Whyte A. & Macfarlan D. (1811) op.cit. p.80.

CAS CHROM Foot plough. Stout curved handle 5½' long, set at 120° into straight footpiece 3' long and shod with rough iron shoe. Peg for man's foot on right side. Furrow turned by human effort.

Hamilton H. (1963) op.cit. p.45

CATTLE For terms used to describe cattle see table 9:1

CHAUMERS (Fr: Chambre) Sleeping quarters provided for single agricultural labourers in lofts, sometimes above stable.

Symon J. (1959) op.cit. p.159

CLAP DYKES Dyke of earth 'clapped' with spade (hence name). Ditch on one side - slope near ditch very gentle, other side very steep. Thoms usually planted in top of dyke.

p.20 URE D. (1794) op.cit.

CLEADING Allowance of 21 sheep per score at sheep sales.

Whyte A. & Macfarlen D. (1811) op.cit. p.65

CONVERTIBLE HUSBANDRY System of having every field in tillage and pasture alternatively. Almost invariably adopted in Argyllshire.
Whyte A. & Macfarlen D. (1811) op.cit. p.95

The alternation of grass and arable c.f. traditional system of permanent grass and permanent arable.
Chambers J.D. & Mingay G.E. (1967) p.4

COWAN Builder of stone without mortar.

O.S.A. Vol.X (1794) p.267 Morvern

DARGER Man to work a day's work.

Buchanan Vol.IX (1793) O.S.A. p.21

DEAF Light, blackish soil on higher ground underlain by rotten whin

Biggar Vol.VI (1845) N.S.A. p.356

DICHT To free grain from chaff and short straws by riddling it.

Historic Notices and Domestic History of the Parish of Shotts
Grossart W. (1880) p.216

DRAMS Proportion of flax taken by miller for dressing. In Argyll, cost is 2/6 per stone and drams of ¼ value of lint.

Smith J. (1813) op.cit. p.100

DRUGGET Cloth with linen warp and woollen weft.

O.S.A. Killearn (1795) Vol.XVI p.118

ETTERLINS Queys in calf in 3rd year.

Rural Recollections George Robertson (1829) op.cit. p.574

EXCAMBION An exchange, specifically of land.
(from Medieval Latin Excamb - to exchange land)

O.E.D.

FANK Pen for sheep.

Graham P. (1812) op.cit. p.293

FARINA Meal made from potatoes.

Smith J. (1813) op.cit. p.92

FARMTOUNS OR BAILE Small settlements - hamlets. Buildings of turf or stone, skin or brushwood - often partly subterranean.

Smout T.C. (1969) op.cit. p.18

FIRE-FANGING Overdrying of dung.

Sinclair J. (1814) op.cit. Vol.III p.513

FOGGAGE Food which cattle can pick up for themselves in fields during winter months. Usually fed extra food during hardest months.

Graham P. (1812) op.cit. p.287

FORTPET ¼ of peck of meal per boll. Given to miller's servant as bannock meal. Taken in addition to multures.

URE D. (1794) op.cit. p.101

FULYIE, FULZIE (1) Filth, dirt, sweepings of street, domestic garbage, dung, excrement.

(2) Manure. Mixed compost of dung and earth.

S.N.D.

FURR Furrow turned over with plough.

URE D. (1794) op.cit. p.8

FURROW Separates ridges from one another.

URE D. (1794) op.cit. p.8

GADESMAN Driver of ploughhorses. Walked backwards before horses, holding horizontal beam to which they are all fastened, and beating them in front so as to make them advance. Ancient and outdated method. Still found in Highlands (1809)

Graham P. (1812) op.cit. p.107

GAITING Method of drying corn in wet and unfavourable conditions. Sheaves are set up singly on lower end instead of in stooks, the band being slipped up near top, and middle opened and exposed loosely to air current. Used only in extremity because much loss by exposing ears of corn to weather and birds.
Graham P. (1812) op.cit. p.152

Setting up of corn in single sheaves, so that if it is wet it may soon dry.
Fenwick (1795) Vol.XIV p.56 O.S.A.

GRAPE Three-pronged iron instrument for digging up potatoes.

Graham P. (1812) op.cit. p.176

GUIL (1) Corn marigold
(2) Ox-eye daisy
(3) Charlock or wild mustard.

S.N.D.

GUSHETS Fractions of ridges.

George Robertson Rural Recollections (1829) op.cit. p.587

HAFFLIN Boy.

Irving GVI & Murray A (1864) op.cit. Vol.III p.5

HAINING Sowing of meadows from mid-April or early May, until time of cutting i.e. 20th July - 15th August, when grass is fully grown.

Graham P. (1812) op.cit. p.186

HARN Linen made of tow, coarser part of flax thrown off when passed through hackle. Spun and imperfectly bleached at home.

Irving GVI & Murray A (1864) op.cit. Vol.III p.7

HAUGH Flat alluvial land by river.

O.E.D.

HAULM Peas straw.

Belsches R. (1796) op.cit. p.30

HOLM Flat ground by river, submerged in time of flood.

O.E.D.

HORSE CORN Light corn, not fit for seed or for grinding into meal. Given to horses. Exempted from thirlage.

URE D. (1794) op.cit. p.101

HORSES For terms used to describe horses see table 10:3

HOUTINGS Largest and wettest sheaves used to cover huts or ricks of hay to prevent bulk of corn getting wet.

O.S.A. Fenwick (1795) Vol.XIV p.56

HUTTING Putting of two or more shocks together in conical form.

Martin A. (1794) op.cit. p.15

HYPOTHEC : RIGHT OF Security of rent by right to tenants goods. Landlord has general right over tenant's moveable property as security of payment of rent. Peculiarly Scottish legal doctrine.

Scotland Since 1707 Campbell R.H. (1965) p.163

IMIDEAL (Butterer) Churn carried on back to lure calves to shielings. Flat on one side to fit on back and covered with skin. A few drops of milk allowed to be jolted out and trickle over skin. Calves followed, trying to lick milk.
K.W. Grant S.H.R. 16 1919 p.151

Also used to churn cream when walking back to village - butter washed an. salted on arrival.

INFIELD AND OUTFIELD Prevailing system of tillage in 18th Century. Infield - near farm - 1/5 area permanently cultivated - oats and barley, dunged. Outfield - great extent - poorer and more distant land - 4/5 area. Ploughing after fertilization by cattle dung and sown with oats or barley until crops poor (2 seeds per 1 sown), then rested for 7-8 years. System fairly uniform. Cultivated in ridges or rigs
Hamilton H. (1963) op.cit. p.37-38

KAIN (HENS) Number of fowls stipulated as part of rent.
Graham P. (1812) op.cit. p.92

LAYAWAL CROP Second crop after breaking up from lay.
URE D. (1794) op.cit. p.53 see Awal Lay Crop

MARK LAND Old division of land in Argyle. Exchequer decreed in 1585 that 40/- (or 3 mark land) should contain 104 acres, i.e. 1 mark land should be 33 acres, 1 rood, 3 perches. Denomination still holds in common speech and generally 1 mark land gives full employ to one plough and one family in more arable areas.
Smith J. (1813) op.cit. p.33

MARROWING Joining of horses two and two to make out a plough. Local term, Easlesham.
O.S.A. (1792) Vol.II p.123

MASHLUM Sowing of late peas with oats. Ayrshire term.
Aiton W. (1811) op.cit. p.271.

MELLS Wooden mallets used to break clods on clay soil. Now superceded by roller.
Graham P. (1812) op.cit. p.111

MILSEY Sieve used to remove impurities from milk before making cheese.
Sinclair J. (1813) Vol.I op.cit. p.69

MOSS MEAL Payment to proprietor of moss for one day's casting of peats.
URE D. (1794) op.cit. p.94

MULTURES A vexatious and heavy payment which was owed to landlord for use of mill. It might amount to 1/12 of unground corn, + c. 1/48 of ground meal. Payment to miller was separate.
Hamilton H. (1963) op.cit. p.46

ONSTEAD The houses and buildings forming a farm steading; a cluster of farmworkers' houses or the like.
S.N.D.

PENDICLES Small farms, in highland Dumbarton, occupied by tenants who are sometimes artificers, and sometimes engaged in woodcutting, herring fishing or other occupations not giving constant employment.

Whyte A. & Macfarlan D. (1811) op.cit. p.39

PIGS For terms used to describe pigs see table 10:5

QUERN Simple grinding instrument consisting of two round stones, the upper one being turned by hand while the corn was poured in through a centre hole.

Hamilton H. (1963) op.cit. p.45

RISTLE Sharp iron, nearly the shape of a coulter, but bent further forward, and like it fixed in a beam with two handles to cut tough sward before the plough which follows in the same line.

O.S.A. Tiree (1795) Vol.XIV p.412

ROUPING Custom of auctioning farms. Practiced in fertile and populous areas, so prospective tenants competed with one another, the farm going to the highest bidder. Very high rents often resulted.

Handley J. (1953) op.cit. p.269

RUMBLING SIVERS Type of drain, common in Dumbartonshire (provincial name) 2-3' deep, 1' wide at bottom and 2-2½' at top. Sometimes filled at random with rounded stones. Sometimes large stones are carefully laid with small ones between them. Ditch filled up with small stones thrown in loosely. Their effect is limited because seldom directed by knowledge of water-bearing strata. Drains easily become choked.

Whyte A. & Macfarlan D. (1811) op.cit. p.182-3

SCILLOC Wild mustard.

N.S.A. Killearn & Kilchenzie (1845) Vol.VII p.389

SHEALINGS Summer grazings. Families and goods went to shealings, leaving skeleton population in villages. Movement in May, return August.

Hamilton H. (1963) op.cit. p.44

SHEEP For terms used to describe sheep see table 10:1

SLOPED GAWS Open drains cut at right angles to ridges, from middle of field to one or both sides of enclosure.

Wilson J. (1812) op.cit. p.130

SOUMING Equivalence maintained between and holding of land, and number of animals - cattle, sheep and horses - to be grazed.

Hamilton H. (1963) op.cit. p.44

STEADIN(G) (1) Building site, piece of ground on which a house or row of houses is built, site of buildings on a farm.

(2) Buildings on a farm, sometimes including and sometimes excluding the farm house.

S.N.D.

STIRK Young bovine animal after weaning; kept for slaughter at age of 2 or 3 years, not for breeding. Usually refers to steer or bullock, less frequently to heifer.

S.N.D.

TACK Lease, tenancy; especially of farm, mill, mining or fishing rights.

S.N.D.

TEATHING Penning up of animals at night to manure part of field. Universal practice in Stirlingshire of 1770; penning to black cattle and sheep, in summer and harvest nights,in folds of hurdles enclosing a circle of ley ground, as a preparation for breaking it up the following season. When sufficiently manured, fold was shifted to another part of field, until whole was gone over.

Graham P. (1812) op.cit. p.262

TEMIN Firm shiny material. Used for cloaks of men and best dresses of women. Long lasting. Made from longest and finest wool treated in some way as flax when worked. Often watered to look like silk for dresses.

K.W. Grant Scot: Hist: Rev: 16 1919 p.148

THIRLAGE Astriction or bondage to particular mills.

Sinclair J. Anal: of Stat: Ac: of Scot: (1831) I p.230

TIDDY Pregnant cow.

Papers Relating to a Renfrewshire Farm 1822-30
Pryde G. p.158

TIRRING Taking of earth from surface so that rock can be mined opencast.

O.S.A. Campsie (1795) Vol.XV p.334

TYNES Teeth of harrow.

Belsches R. (1796) op.cit. p.39

WAUK Fulling mill.

O.S.A. Sorn (1798) Vol.XX p.149

WERSH CROP Third and last crop on outfield after breaking up. Very poor, grain bad, land exhausted.

URE D. (1794) op.cit. p.45

WHIG Serous watery part of milk.

N.S.A. Rutherglen (1845) Vol.VI p.385

WINTERTOWN Infield.

N.S.A. Inveraray (1845) Vol.VII p.28

WOOL Wool from sheep which have been smeared is called dun, c.f. white wool from unsmeared animals.

Graham P. (1812) op.cit. p.295

WRACK Couch grass.

Irving GVI & Murray A (1864) Vol.III op.cit. p.6

WRAIC Sea ware, used as manure.

N.S.A. Argyll Vol.VII (1845) Killean & Kilchenzie p.389

YEILD BEASTS Young cattle.

Irving GVI & Murray A Vol.III op.cit. p.7

APPENDIX 3

SELECTED BIBLIOGRAPHY

ADAM : M.I.

The causes of the Highland emigrations of 1783-1883.

S.H.R. XVI 1919 pp.280-293

ADAMS : I.H.

The Land Surveyor and his influence on the Scottish Rural Landscape.

S.G.M. LXXXIV No 3, 1968 pp.248-255

ADAMS : I.H.

Division of the Commonty of Hassendean 1761-1763.

Stair Society Miscellany I 1971 pp.171-192

ADAMS : I.H.

The Historical Geography of The Gifford and Garval Light Railway.

T.E.L.A.S. 13(1972) pp.77-96

ADAMS : I.H.

Agrarian Landscape Terminology : A glossary for historical geographers.

I.B.G. Special Publication 9, 1976

ADAMS : I.H.

The Making of Urban Scotland.

1978

AITON : W.

General View of The Agriculture of The County of Ayr.

1811

AITON : W. Ed: (See Sinclair Sir J.)

On Livestock in Scotland - Appendix to the General Report on the Agricultural State of Scotland.

Vol II 1814

AITON : W.

General View of The Agriculture of The County of Bute.

1816

ALISON : W.P.

Observations on the famine of 1846-7, in the Highlands of Scotland and in Ireland, as illustrating the connection of the principle of population with the management of the poor.

1847

ARGYLL : DUKE OF

Scotland as it was and as it is.

1887

ATTWOOD : E.A.

The Origins of State Support for British Agriculture.

M.S.E.S.S. XXXI, 1963 pp.129-148

AYDELOTTE : W.O.

Quantification In History.

Am. H.R. 71, 1966 pp.803-825.

AYTON : RICHARD

A Voyage Round Great Britain Summer 1813.

1814-1820

BAIROCH : P.

Agriculture and The Industrial Revolution 1700-1914.

In The Fontana Economic History of Europe 3, The Industrial Revolution, Ed: Carlo M. Cipolla

1969

BAKER : A.R.H., HAMSHERE : J.D. and LANGTON J. (Eds),

Geographical Interpretations of Historical Sources.

1970

BAKER : A.R.H. and BUTLIN : R.A. (Eds),

Studies of Field Systems in The British Isles.

1974

BALD : A.

The Farmer and Corn Dealer's Assistant

1780

BELSCHES : R.

General View of The Agriculture of The County of Stirling.

1796

BEVERIDGE : W.H.

Prices and wages in England from the twelfth century to the nineteenth century I : Price tables in the mercantile era.

1939

BOARD OF AGRICULTURE

Communications to the Board of Agriculture 1797-1811

BOARD OF AGRICULTURE

The advantages which have resulted from the establishment of the Board of Agriculture.

Lecture - May 26th 1809

BOARD OF AGRICULTURE

Agricultural State of the Kingdom in February, March and April 1816; being the substance of replies to a circular letter sent by the Board of Agriculture to every part of the Kingdom.

1816

BOSERUP : E.

The Conditions of Agricultural Growth - the economics of agrarian change under population pressure.

1965

BOTFIELD : B.

Journal of a tour through the Highlands of Scotland. Summer 1829.

1830

BOWLEY : A.L.

Agricultural Wages in Scotland.

J.R.S.S. 1899 p.140-149

BUTLIN : R.A.

Some terms used in Agrarian History : A Glossary.

A.H.R. IX (2) 1961 pp.98-104

BUTLIN : R.A.

Recent developments in studies of the Terminology of Agrarian Landscapes.

A.H.R. XVII (2) 1969 pp.141-160

BUTTRESS : F.A. (Ed)

Agricultural Periodicals of The British Isles 1681-1900, and their location.

1950

CADDELL : H.M.

Land Reclamation in the Forth Valley.

S.G.M. 45 (1929) pp.7-22 and 81-89

CAIRD : J.

High Farming vindicated and further illustrated.

1849

CAIRD : J.B.

The Making of The Scottish Rural Landscape.

S.G.M. 80 1964 pp.72-80

CAMPBELL : A.

A Journey from Edinburgh through parts of North Britain, containing remarks on the Scottish landscape ..... observations on rural economy.

1811

CAMPBELL : R.H.

The Highland Economy 1750-1850.

S.J. Pol Econ Vol 6 1959 pp.59-77

CAMPBELL : R.H.

Scotland since 1707 - The Rise of an Industrial Society

1965

CAMPBELL : R.H. and DOW : J.B.A.

Source Book of Scottish Economic and Social History.

1968

CARTER : E.F.

An Historical Geography of The Railways of The British Isles.

1959

CHAMBERS : J.D.

The Workshop of The World.

1961

CHAMBERS : J.D. and MINGAY : G.E.

The Agricultural Revolution 1750-1880

1967

CLAPHAM : J.H.

Economic History of Modern Britain.

1926

CLARK : J.G.D.

Prehistoric Europe, The Economic Basis.

1952

CLELAND : J.

Statistical Tables relative to the City of Glasgow.

1823

CLELAND : J.

Enumeration of the Inhabitants of the City of Glasgow and County of Lanark for the Government Census of 1831.

1832

CLERK : D.

On The Agriculture of The County of Argyll.

TRHAS X 1879 pp.1-30

COHEN : R.L.

The Economics of Agriculture.

1949 (Revised)

COLLINS : E.J.T.

The Diffusion of The Threshing Machine in Britain 1790-1880.

Tools and Tillage (2) 1972 pp.16-33

COLLINS : E.J.T. and JONES : E.L.

Sectoral Advance in English Agriculture 1850-1880.

A.H.R. 15(2) 1967 pp.65-81

THE COMPLETE FARMER

A general dictionary of agriculture and husbandry.

2 Vols 5th Ed. 1807

COPPOCK : J.T.

The Agricultural Returns as a Source for Local History.

Amateur Historian IV No 2 1958 pp.49-55

COPPOCK : J.T.

Maps as Sources for the study of land use in the past.

Imago Mundi 22 (1968) pp.37-49

COURT : W.H.B.

A Concise Economic History of Britain from 1750 to recent times.

1954

CRAIGIE : W.A. and AITKEN A.J.

A Dictionary of The Older Scottish Tongue
Vol 1 1937
Vol 2
Vol 3 1963
(completed up to letter O)

OUP 1937 - continuing

CRAWFURD : G.

History of the Shire of Renfrew.

Ed: G. Robertson 1818

CREGEEN : E.R. (Ed)

Argyll Estate Instructions, Mull, Morven and Tiree. 1771-1805.

1964

DODGSHON : R.A.

Agricultural Change In Roxburghshire and Berwickshire 1700-1815.

1969 PhD Thesis University of Liverpool

DRESCHER : L.

The Development of Agricultural Production in Great Britain and Ireland from the early nineteenth century.

M.S.E.S.S. XXIII No 2, 1955 pp.153-175

EAST : G.

Land utilization in Lanarkshire at the end of the eighteenth century.

S.G.M. 53 1937 pp.89-109

ERNLE : R.E. PROTHERO : LORD

English Farming Past and Present.

5th Edn: Ed Sir A.D. Hall London 1936

FAIRHURST : H.

The Rural Settlement Pattern of Scotland.

In Steel R.W. and Lawton R. (Ed) Liverpool Essays in Geography 1967

FAIRLIE : S.

The Nineteenth Century Corn Law Reconsidered.

E.H.R. 18 1965 pp.562-575.

FAIRLIE : S.

The Corn Laws and British Wheat Production, 1829-76.

E.H.R. 22 1969 pp.88-116.

FENTON : A.

Paring and Burning and Cutting of Turf and Peat in Scotland.
'The Spade in Northern and Atlantic Europe'
Ed: A. Ganley and A. Fenton 1970 pp.155-193

FLETCHER : T.W.

Drescher's Index : A comment.

M.S.E.S.S. XXIII 1955 pp.176-183

FLYNN : M.W.

Origins of the Industrial Revolution.

1963

FRANKLIN : J. BEDFORD

Scottish Farming : A History of Scottish Farming.

1952

FULLARTON : W.

General View of the Agriculture of The County of Ayr.

1793

GAILEY : R.A.

Settlement Changes in the S.W. Highlands 1700-1960

Unpublished PhD Thesis, University of Glasgow 1960

GAILEY : R.A.

Settlement and Population in Kintyre 1750-1800.

S.G.M. 76, 1960 pp.99-107

GAILEY : R.A.

The Mobility of Tenants on a Highland Estate in the Early Nineteenth Century.

S.H.R. 40, 1961 pp.136-154

GAILEY : R.A.

The Evolution of Highland Rural Settlement - Argyllshire.

S.S. 6 1962 pp.155-177

GAILEY : R.A.

Agrarian Improvement and The Development of Enclosure in the South West Highlands of Scotland.

S.H.R. (42) 1963 pp.108-121

GARDNER H.W. and GARDNER H.V.

The Use of Lime in British Agriculture.

1953

GAZETEER

Ordnance Gazeteer of Scotland.

1883

GEDDES : A.

Scotland's Statistical Accounts of Parish, County and Nation c. 1790-1825 and 1835-1845.

S.S. III 1959 p.17

GORDON : T.

The Farmers Lawyer; being a Manual of the Law of Scotland in relation to Agricultural Subjects.

1844

GOURVISH : T.R.

A note on bread prices in London and Glasgow, 1788-1815.

J.E.H. XXX, No 4, 1970 pp.854-860

GOURVISH : T.R.

The Cost of Living in Glasgow in the early nineteenth century.

E.H.R. (25) 1972 pp.65-80

GRAHAM : P.A.

General View of The Agriculture of The County of Stirling.

1812

GRANT : I.F.

The Social and Economic Development of Scotland Before 1603.

1930

GRANT : K.W.

Peasant Life In Argyllshire in the end of the Eighteenth Century.

S.H.R. XVI (1919) pp.144-150

GRAY : M.

The Kelp Industry in the Highlands of Scotland.

E.H.R. IV 1951-52 pp.197-209

GRAY : M.

The Abolition of Run-rig in the Highlands of Scotland.

E.H.R. V (second series) 1952-53 pp.46-57

GRAY : M.

The Highland Potato Famine of the 1840's.

E.H.R. VII (second series) 1954-55 pp.357-368

GRAY : M.

Consolidation of the Crofting System.

A.H.R. V 1957 pp.31-47

GRAY : M.

The Highland Economy 1750-1850

1957

GREENSHIELDS : J.B.

Annals of The Parish of Lesmahagow.

1864

GRIGG : D.B.

The Agricultural Revolution in South Lincolnshire.

1966

GRIGG : D.B.

The changing agricultural geography of England - a commentary on the sources available for the reconstruction of the agricultural geography of England 1770-1850.

I.B.G.T. Vol 41 1967 pp.73-96

GROSSART : W.

Historic Notices and Domestic History of the Parish of Shotts.

1880

HADFIELD : C.

The Canal Age.

1968

HALDANE : A.R.B.

The Drove Roads of Scotland.

1952

HALDANE : A.R.B.

New Ways Through The Glens.

1962

HAMILTON : H.

The Industrial Revolution in Scotland.

1932

HAMILTON : H.

The Economic Evolution of Scotland in the Eighteenth and Nineteenth Centuries.

1933

HAMILTON : H.

An Economic History of Scotland in the Eighteenth Century.

1963

HAMILTON : J.R.C.

Excavations at Jarlshof.

H.M.S.O. 1956

HANDLEY : J.E.

Scottish Farming in the Eighteenth Century.

1953

HANDLEY : J.E.

The Irish in Scotland.

1963

HANDLEY : J.E.

The Agricultural Revolution in Scotland.

1963

HEADRICK : J.

View of The Mineralogy, Agriculture, Manufactures and Fisheries of The Island of Arran.

1807

HER MAJESTY'S STATIONERY OFFICE

A Century of Agricultural Statistics, 1866-1966

1968

HERON : R.

Journey to the West of Scotland 1792

2 Vols 1793

HERON : R.

General View of The Agriculture of The Hebrides.

1794

HERON : R.

Scotland Described.

1797

HILL : R.

Tour in The Highlands 1803

1888

HOBSBAWM : E.J.

The British Standard of Living 1790-1850

E.H.R. (second series) X 1957-58 pp.46-68

HORNE : T.H.

The Complete Grazier; or Farmer and Cattledealer's Assistant ..... together with a synoptical table of the different breeds of neat cattle, sheep and swine. London 1805

8th Edn: revised by W. Youatt, London 1846

HORNER : P.B.

Tour In Summer 1803.

1804

HOUSTON : G.

Labour Relations in Scottish Agriculture Before 1870.

A.H.R. VI Part I 1958 p.27

HOUSTON : G.

Agricultural Statistics in Scotland Before 1866.

A.H.R. IX (2) 1961 pp.93-97.

IRVING : G.V.I. and MURRAY : A.

The Upper Ward of Lanarkshire Described and Delineated.

(3 vols) 1864

IRVING : J.

The West of Scotland in History.

1885

JOHN : A.H.

Farming in Wartime : 1793-1815

In E.L. Jones and G.E. Mingay (Eds). Land, Labour and Population in the Industrial Revolution, 1967, pp.28-47.

JOHNSTON : T.

A History of The Working Classes in Scotland.

1920

JONES : E.L. (Ed)

Agriculture and Economic Growth in England, 1650-1815.

1967

JONES : E.L.

The Development of English Agriculture 1815-73.

1968

JONES : E.L.

The Changing Basis of English Agricultural Prosperity, 1853-73.

In Essays in Agrarian History Ed: Minchinton W.E. Vol.II (1968)

JONES : E.L. and WOOLF : S.J. (Eds)

Agrarian Change and Economic Development.

1969

JONES : G.E.

The Diffusion of Agricultural Innovations.

In I. Burton and R.W. Kates (Eds) Readings in Resource Management and Conservation.

1965 pp.475-501.

KAMES : LORD

The Gentleman Farmer, being an Attempt to improve Agriculture by subjecting it to the Test of rational principles.

1776 6th Ed: 1815

KEITH : G.S.

General View of The Agriculture of The County of Aberdeen.

1811

KERRIDGE : E.

The Agricultural Revolution.

1967

KIRK : W.

The Primary Agricultural Colonisation of Scotland.

S.G.M. 73 (1957) pp.64-99

KIRKWOOD : J.

Troon and Dundonald.

1875

KYD : J.G.

Scottish Population Statistics.

S.H.S. 44 (third series) 1952 pp.82-86

LANDELLS : J.

Agriculture.

In Ordnance Gazetteer of Scotland Vol.VI 1885

LAVERGNE : L. DE

The Rural Economy of England, Scotland and Ireland.

1855

LEBON : J.H.G.

Ayrshire.

In Stamp L.D. The Land of Britain I 1937

LEBON : J.H.G.

Changes in the Distribution of Population and Settlements in Ayrshire and South Renfrewshire during the Eighteenth and Nineteenth Centuries.

PhD Thesis, University of London, 1946

LEBON : J.H.G.

The Face of the Countryside in Central Ayrshire during the Eighteenth and Nineteenth Centuries.

S.G.M. 62 1946 pp7-15

LEEMING : F.A.

Social Accounting and the Old Statistical Account.

S.G.M. 79 1963 pp.34-48

LEYDEN : J.

Tour in the Highlands in 1800.

1903

LINDSAY : J.

The Canals of Scotland.

1968

MANLEY : G.

Climate and The British Scene.

1952

MARTIN : A.

General View of the Agriculture of the County of Renfrew.

1794

MATHEW : W.M.

Peru and the British Guano Market, 1840-70.

E.H.R. 23 1970 pp.112-128

MATHIAS : P.

The First Industrial Nation. An Economic History of Britain, 1700-1914.

1969

MILLMAN : R.

The Making of the Scottish Landscape.

1975

MINCHINTON : W.E.

Agricultural Returns and The Government during the Napoleonic Wars.

A.H.R. 1 1953 p.29

MINCHINTON : W.E. (Ed)

Essays in Agrarian History.

Vols 1 and 2 1968

MINGAY : G.E.

Enclosure and the Small Farmer in the Age of The Industrial Revolution.

1968

MINGAY : G.E.

The Agricultural Revolution in English History; A Reconsideration.

Reprinted in Essays In Agrarian History Vol II Ed: E. Minchinton 1968

MITCHISON : R.

The Old Board of Agriculture (1793-1822)

Eng: H.R., LXXIV, 1959 pp.41-69.

MITCHISON : R.

Agricultural Sir John - The Life of Sir John Sinclair of Ulbster 1754-1835.

1962

MITCHISON : R.

The movements of Scottish corn prices in the seventeenth and eighteenth centuries.

E.H.R. 18 (second series) 1965 pp.278-291

MITCHISON : R.

A History of Scotland.

1970

MOIR : D.G.

The Roads of Scotland.

S.G.M. 73 (1957) pp.101-110; 167-175

MOODIE : D.W.

Content Analysis : a method for historical geography.

Area 3 (3) 1971 pp.146-149

MORGAN : V.

The First Statistical Account as a basis for studying The Agrarian Geography of Late Eighteenth Century Scotland.

Unpublished PhD Thesis, University of Cambridge 1969

MORGAN : V.

Agricultural Wage Rates in Late Eighteenth Century Scotland.

E.H.R. XXIV 1971 pp.181-121

MOSSMAN : R.C.

On the Price of Wheat at Haddington from 1627-1897.

The Accountant's Magazine, 4(1900) pp.94-110

MOYES : M.D.

Renfrewshire.

In Stamp L.D. The Lord of Britain (1946)

MacCULLOCH : J.

Description of the Western Islands of Scotland, including the Isle of Man.

3 vols. 1819

MACDONALD : J.

General View of The Agriculture of The Hebrides.

1811

MACLEAN : J.P.

History of Mull.

2 vols. 1923-5

MACNAB : P.A.

The Isle of Mull.

1970

NAISMITH : J.

General View of The Agriculture of The County of Clydesdale.

1794; 1798; 1813

NAISMITH : J.

Observations on the different breeds of sheep and the state of sheep farming in the southern districts of Scotland.

1795

NAISMITH : J.

Elements of Agriculture.

1807

NAPOLITAN : L.

The centenary of the agricultural census.

J.R.A.S.E. 127, 1966 pp.81-98

THE NEW STATISTICAL ACCOUNT OF SCOTLAND

By the Ministers of the respective Parishes, under the superintendence of a committee of the Society for the Benefit of the Sons and Daughters of the Clergy.

15 vols. 1845

O'DELL : A.C.

The Population of Scotland, 1755-1931 : A General Survey.

S.G.M. 48, 1932 pp.282-90

O'DELL : A.C.

A Geographical Interpretation of the Development of Scottish Railways.

S.G.M. 55, 1939 pp.129-148

O'DELL : A.C.

A View of Scotland in the Middle of The Eighteenth Century.

S.G.M. 69, 1953 pp.58-63

ORWIN : C.S.

English Farming. A History of English Farming.

1940

ORWIN : C.S. and WHETHAM : E.H.

A History of British Agriculture 1846-1914.

1964

OSBORNE : R.H.

The Movements of People in Scotland, 1851-1951.

S.S. II 1958 pp.1-46

PARRY : M.L.

Changes in the Upper Limit of Cultivation in S.E. Scotland 1600-1900.

Unpublished PhD Thesis, University of Edinburgh 1973

PARRY : M.L.

Climatic Change, Agriculture and Settlement.

1978

PATERSON : G.

Historical Account of The Fiars in Scotland.

1852

PERCIVAL : J.

Wheat In Great Britain.

1934

PERRY : P.J.

British Farming in the Great Depression, 1870-1914.

1974

PLANT : M.

Domestic Life in Scotland in the Eighteenth Century.

1952

PLAYFAIR : J.

A Description of Scotland, Geographical and Statistical.

2 vols. 1819

PREBBLE : J.

The Highland Clearances.

1963

PRYDE : G.S. (Ed)

Papers relating to a Renfrewshire farm, 1822-30.

M.S.H.S. VIII (third series) 1951 pp.137-162

PRYDE : G.S.

Scotland from 1603 to the present day.

1962

PURDY : F.

Agricultural Ways in Scotland and Ireland.

J.R.S.S. (25) 1862 pp.425-90

RAMSAY : A.

History of the Highland and Agricultural Society of Scotland.

1879

RENFREW : C.

Before Civilization.

1973

ROBERTSON : G.

General Report of The Agriculture of The County of Midlothian.

1795

ROBERTSON : G.

Rural Recollections.

1829

ROBERTSON : I.M.L.

Changing Form and Function of Settlement in South-West Argyll, 1841-1961

S.G.M. LXXXIII, No 1, 1967 pp.29-45

ROBSON : J.

General View of the Agriculture of the County of Argyll.

1794

ROSTOW : W.W.

The Stages of Economic Growth.

1960

RYDER : M.

The Evolution of Scottish Breeds of Sheep.

S.S. XII 1968 pp.127-167

RYDER : M.L.

Sheep and the clearances in the Scottish Highlands. A Biologist's View.

A.H.R. (16) 1968 pp.155-158

SALAMAN : R.N.

The History and Social Influence of The Potato.

1949

SCOLA : P.M.

A Century of Agricultural Statistics.

1965 Scottish Agriculture XLV (4) p.165-168

SELKIRK : 5th EARL OF

Observations of the Present Stage of the Highlands of Scotland with a view of the causes and probable consequences of emigration.

1805

SHAW : J.E.

Ayrshire 1745-1950. A Social and Industrial History.

1953

SHENNAN : H.

Boundaries of Counties and Parishes in Scotland. As settled by the Boundary Commissions under the Local Government (Scotland) Act, 1889.

1892

SIMPSON : D.D.A. (Ed)

Economy and Settlement in Neolithic and Early Bronze Age Britain and Europe.

1971

SINCLAIR : SIR JOHN

General View of the Northern Counties of Scotland.

1795

SINCLAIR : SIR JOHN

Account of the system of husbandry adopted in the more improved districts of Scotland.

1813

SINCLAIR : SIR JOHN

General Report of the Agricultural State and Political Circumstances of Scotland.

5 vols. 1814

SINCLAIR : SIR JOHN

Analysis of the Statistical Account of Scotland, with a general view of the history of that country, and discussions on some important branches of political economy.

1825

SLAVEN : A.

The Development of the West of Scotland, 1750-1960.

1975

SLICHER VAN BATH : H.

The Agrarian History of Western Europe. 500AD - 1850AD

1963

SMALL : A.

Excavations at Underhoull, Unst, Shetland.

P.S.A.S. (98) 1964-65 pp.225-248

SMITH : J.

General View of the Agriculture of The County of Argyll.

1813

SMITH : J.H.

The Cattle Trade of Aberdeenshire in the Nineteenth Century.

A.H.R. III, part 2, 1955 pp.114-118

SMOUT : T.C.

Scottish Trade on The Eve of The Union; 1660-1707

1963

SMOUT : T.C. and FENTON A.

Scottish Agriculture Before the Improvers - An Exploration.

A.H.R. (13) 1965 pp.73-93

SMOUT : T.C.

A History of The Scottish People 1560-1830.

1969

SOMERVILLE : A.

The Autobiography of A Working Man.

1848

STAMP : L.D.

Lanarkshire.

In Stamp L.D. The Land of Britain 1946

STAMP : L.D.

Stirlingshire.

In Stamp L.D. The Land of Britain 1946

THE STATISTICAL ACCOUNT OF SCOTLAND

Drawn up from the communications of the Ministers of the different parishes by Sir John Sinclair,

21 vols. Edinburgh 1791-9

STRACHAN : A.J.

The Rural-Urban Fringe of Edinburgh 1850-1967.

Unpublished PhD Thesis, University of Edinburgh 1969

STURROCK : A.

Report on the Agriculture of Ayrshire.

T.R.H.A.S.S. 48 1 1866-67 pp.21-105

SYMON : J.A.

Scottish Farming Past and Present.

1959

THIRD : B.M.W.

The Significance of Scottish Estate Plans and Associated Documents.

S.S. (1) 1957 pp.39-64

THOMAS : D.

Agricultural Changes in the Welsh Borderland.

Trans: Hon: Soc: of Cymmrodorion Part I, 1961, pp.101-14. Also in Geographical Interpretations of Historical Sources, Baker, Hamshere and Langton 1970

THOMAS : J.

Regional History of the Railways of Great Britain Vol. 6 Scotland.

1971

THOMPSON : A.R.

The Use of Libraries by The Working Class in Scotland in the early Nineteenth Century.

S.H.R. (42) 1963 pp.21-29

THOMPSON : F.M.L.

The Second Agricultural Revolution, 1815-80.

E.H.R. (second series) XXI 1968 pp.62-77

TOOKE : T. and NEWMARCH : W.

A History of Prices.

6 vols. 1838-57; facsimile reprint 1928

TROW-SMITH : R.

A History of British Livestock Husbandry 1700-1900.

1959

TURNER : W.H.K.

Flax cultivation in Scotland : an historical geography.

I.B.G.T. (55) 1972 pp.127-143

TURNOCK : D.

North Morar : The Improving Movement on a West Highland Estate.

S.G.M. (85) 1969 pp.17-30

TURNOCK : D.

The Evolution of Farming Patterns in Lochaber.

I.B.G.T. (40) 1967 pp.145-58.

URE : D.

General View of the Agriculture of The County of Dumbarton.

1794

URQUHART : R.

Farming In Scotland.

1967

VAMPLEW : W.

Railways and The Transformation of The Scottish Economy.

E.H.R. (24) 1971 pp.37-54

VENN : J.A.

The Foundations of Agricultural Economics.

1933

VINCE : S.W.E.

The Highlands of Scotland.

In Stamp L.D. The Land of Britain I (1944)

WALKER : J.

An Economical History of the Hebrides and Highland of Scotland.

1808

WARD : J.T.

Ayrshire Landed Estates in the Nineteenth Century.

Ayrshire Collections 8 1967-9

WATSON : J.A.S. and MORE J.A.

Agriculture, The Science and Practice of British Farming.

1924; 1944

WATSON : J.A.S.

The Agricultural Revolution in Scotland; 1750-1810

T.R.H.A.S.S. (41) 1929 pp.1-20

WATSON : J.S.

Scotland's Contribution to Agricultural Progress.

Journal of Edinburgh Agricultural Former Students Association November 1957 pp.11-22

WEIR : R.B.

The Distilling Industry in Scotland in the Nineteenth Century and Early Twentieth Century.

Unpublished PhD Thesis, University of Edinburgh 1974

WHEELER : P.T.

Land Ownership and The Crofting System in Sutherland Since 1800.

A.H.R. XIV 1966 part i pp.45-56

WHETHAM : E.H.

Prices and production in Scottish farming. 1850-70

S.J. Pol: Econ: IX 1962 pp.233-243

WHETHAM : E.H.

Livestock prices in Britain, 1851-93.

A.H.R. XI (1) 1963 pp.27-35

WHETHAM : E.H.

The Economic Background to Agricultural Policy.

1960

WHETHAM : E.H.

Sectoral Advance in English Agriculture 1850-1880 : A Summary.

A.H.R. 16 (1) 1968 pp.46-48

WHYTE : A. and MACFARLAN D.

General View of the Agriculture of the County of Dumbarton.

1811

WHYTE : I.D.

Agrarian Change in Lowland Scotland in the Seventeenth Century.

Unpublished PhD Thesis, University of Edinburgh 1974

WILLAN : T.S.

The Inland Trade.

1976

WILLIAMS : H.T. (Ed)

Principles of British Agricultural Policy.

1960

WILSON : J.

General View of the Agriculture of the County of Renfrew.

1812

WILSON : J.

The Gazeteer of Scotland.

1882

WITNEY : D.

Scottish Agriculture Major Economic Trends, 1857-1957.

Journal of Edinburgh Agricultural Former Students Association November 1957 pp.23-37

WORDSWORTH : D.

Recollections of a Tour made in Scotland in AD 1803.

YOUNGSON : A.J.

After the Forty-Five.

1973